



ANNUAL REPORT
OF THE
Fruit Growers' Association

ONTARIO

1919

Ontario Department of Agriculture

FIFTY-FIRST ANNUAL REPORT

OF THE

Fruit Growers' Association

OF

Ontario

1919

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO



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1920

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To His Honour LIONEL CLARKE,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the honour to present herewith for your consideration the Fifty-first Report of the Fruit Growers' Association of Ontario for the year 1919.

Respectfully yours,

MANNING W. DOHERTY,

Minister of Agriculture.

Toronto, 1920.

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Fruit Growers' Association of Ontario

OFFICERS FOR 1920

<i>President</i>	D. ALLAN, Grimsby.
<i>Vice-President</i>	H. SIRETT, Brighton.
<i>Secretary-Treasurer</i>	P. W. HODGETTS, Parliament Buildings, Toronto.
<i>Executive</i>	Officers, together with A. CRAISE, St. Catharines, and C. R. TERRY, Clarkson.
<i>Auditor</i>	D. F. CASHMAN.

DIRECTORS.

Div. 1. W. T. MACOUN, Ottawa.	Div. 8 A. CRAISE, St. Catharines.
2. J. C. KEELER, Brockville.	9. J. E. JOHNSON, Simcoe.
3. R. W. IRELAND, Wellington.	10.
4. H. SIRETT, Brighton.	11. H. K. REVELL, Goderich.
5. W. J. BRAGG, Bowmanville.	12. J. F. ELLIOTT, Oxford Centre.
6. C. R. TERRY, Clarkson.	13. W. L. HAMILTON, Collingwood.
7. DAVID ALLAN, Grimsby.	O.A.C. PROF. J. W. CROW, O.A.C., Guelph.
	H.E.S. E. F. PALMER, Vineland.

REPRESENTATIVES TO FAIR BOARDS AND CONVENTIONS.

Canadian National: W. F. W. FISHER, Burlington.
London: J. C. HARRIS, Ingersoll, and A. SADLER, Lambeth.
Ottawa: W. T. MACOUN, Ottawa.

COMMITTEES.

Horticultural Publishing Company: HAMILTON FLEMING, Grimsby.
New Fruits: W. T. MACOUN, Ottawa; PROF. J. W. CROW, Guelph; E. F. PALMER, Vineland Station.
Historical: A. W. PEART, Burlington; W. T. MACOUN, Ottawa.
Transportation: T. H. P. CARPENTER, Winona; W. H. BUNTING, St. Catharines; W. R. DEWAR, Leamington; JAS. E. JOHNSON, Simcoe; W. A. SHOOK, Clarkson; W. F. W. FISHER, Burlington; M. C. SMITH, Burlington.
Royal Show: DAVID ALLAN, Grimsby; J. E. JOHNSON, Simcoe; W. F. W. FISHER.
Ontario Horticultural Exhibition: D. ALLAN, J. E. JOHNSON, ELMER LICK, W. F. W. FISHER.

TREASURER'S REPORT

RECEIPTS.

Balance on hand, Dec. 31, 1918	\$825 19
Membership Fees	215 25
Government Grant	1,700 00
Ont. Horticultural Exhibition, Entry Fees	34 65
Interest	29 43
	<hr/>
	\$2,804 52

EXPENDITURES.

Annual Meetings, February and November	\$654 80
Committees	244 36
Periodicals	196 95
Stock	300 00
Show	197 19
Miscellaneous	257 62
Balance on Hand	953 70
	<hr/>
	\$2,804 52

DETAILS OF EXPENDITURE

ANNUAL MEETINGS:

February, 1919.

Advertising.		Printing.	
Grimsby <i>Independent</i>	\$5 15	College Press	\$33 45
St. Catharines <i>Journal</i>	4 15	B. Hoover	8 25
St. Catharines <i>Standard</i>	3 75	Reporting.	
Travelling Expenses.		Miss Maud Coe	60 00
A. D. Harkness	10 65	A. Sadler	7 25
Prof. Chandler	51 45		
E. C. Everett	15 15	Total	\$208 00
F. Shearer	5 85		
A. W. Peart	2 90		

November, 1919.

Heaters, Consumers' Gas Co.	\$40 25	Advertising.	
Programmes, College Press	20 00	F. H. Leslie	\$5 15
American Tent Co., enc.	20 00	Grimsby <i>Independent</i>	3 15
Travelling Expenses.		<i>Farmer's Advocate</i>	15 15
T. G. Bunting	32 10	McLean Pub. Co.	13 20
F. C. Keeler	20 00	St. Catharines <i>Standard</i>	5 00
Jas. E. Johnson	12 50	<i>Farm and Dairy</i>	7 35
F. C. Sears	112 57	<i>Gazette, Burlington</i>	3 15
E. J. Atkin	26 16	<i>The Guide, Port Hope</i>	3 15
Expenses, P. W. Hodgetts	15 35	<i>Canadian Horticulturist</i>	10 65
Freight, G. T. Ry.	44 72	<i>Canadian Farm</i>	9 00
Light, Canadian National Exhi-		<i>Farmers' Sun</i>	9 00
bition	4 20	<i>Family Herald</i>	15 00
		Total	\$446 80

COMMITTEES.

Travelling Expenses.		H. P. Carpenter	\$139 81
H. Sirett	\$7 25	H. Leavens	13 65
Jas. E. Johnson	13 60	A. A. Craise	12 15
W. H. Bunting	37 40	P. W. Hodgetts	6 30
H. K. Revell	14 20		
Horticultural Publishing Company, Stock			\$300 00

SHOW.

W. F. Kydd, expenses	\$13 00
Manning Cold Storage, Storage and Freight	172 19
J. J. Pritchard, Fruit	12 00
Total	\$197 19

PERIODICALS.

<i>Canadian Horticulturist</i>	\$196 95
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MISCELLANEOUS.

D. Cashman, Auditor	\$10 00
Horticultural Relief Fund for Allied Countries, per Royal Horticultural Society, London, Eng.	100 35
Wages of Office Help	119 00
Dominion Guarantee Co., Treasurer's Bond	10 00
Postage and Exchange	1 77
College Press, Printing	16 50
Total	\$257 62

Fruit Growers' Association of Ontario

ANNUAL CONVENTION

The sixtieth annual meeting of the Fruit Growers' Association of Ontario was held on the premises of the Canadian National Exhibition, Toronto, on the 12th, 13th and 14th of November, 1919. Much interest was manifested in the proceedings, as the addresses and discussions were of a most practical character.

Mr. James E. Johnson, of Simcoe, President of the Association, occupied the chair.

PRESIDENT'S ADDRESS.

JAS. E. JOHNSON, SIMCOE.

It affords me a great deal of pleasure to welcome the Ontario Fruit Growers to this Sixtieth Annual Convention, to discuss the many difficult questions of the day. This gathering will mean renewed activity in the production of fruit this coming year. I hope that all present will feel that this is their meeting, and that you will become acquainted with your fellow fruit growers, and so help to make this a social and educational gathering.

The Horticultural Exhibition of Fruits in the Transportation Building is certainly a great object-lesson to the Fruit Growers of Ontario, and every Fruit Grower attending should be very enthusiastic, and should put forth every effort in order to produce the finest quality of apples suitable for box-packing. I especially call your attention to the Fruit Exhibit put up by the Ontario Department of Agriculture taken from their Demonstration Orchards. Mr. W. F. Kydd, who is our orchard demonstrator, will deal at length with the care of Government-leased orchards by giving you the facts and figures of care, costs, and production. The demonstration orchard in Norfolk County was visited by many fruit growers from all parts of Ontario, and I am certain that the results of their work upon this orchard will be a great inducement to our Norfolk apple growers to spend more money on the care of their orchards, which will result in the production of a large quantity of nice quality box apples for next season.

I sincerely hope that the Department of Agriculture will extend its work, and now is the time to do so, before it is too late, as apple production is on the decline in Ontario. I also think that the Department of Agriculture can do great work in having experienced fruit men throughout Ontario, to be known as Instructors in the growing and packing of fruit. The Dominion Government does something in this line at present, when the Fruit Inspectors are examining fruit for shipment, but I believe it is up to the Province of Ontario to carry on the line of educational fruit-growing for its own people.

I am more in favor of boxing apples than ever before, as apples wrapped in paper will keep far better than when packed in barrels. In the apple season we are almost sure to have weather conditions too warm for the packing of the apples in barrels. When the weather is warm and apples are packed in large packages heat is generated which results in the decaying of the fruit. Next year at the

Horticultural Exhibition it would please me to see a demonstration of packing of apples with an up-to-date sizer.

We have many soldiers taking up fruit-growing, and we should do all we possibly can to aid them and keep them contented on fruit farms. We must get a back-to-the-land movement which we cannot expect under existing conditions. Before this can be accomplished we have got to have a co-operation of all classes, whether working in the field, factory, or office, and make known to each other our exact positions unselfishly.

During the four anxious years of the war we were all wishing for the end of the struggle to come, thinking the conditions would then be much better, but we find ourselves to-day in a world of ugly temper and misunderstanding. We should take an interest in the other fellows' problems. The greatest difficulty we face to-day is that of understanding. We have had too much talk about masses and classes and too little recognition of the truth that, in the main, all men are very much alike. If we but had a better opinion of the others' ideas it would make for greater contentment, and this would result in greater progress. The time is nearly at hand when capitalists must give more thought to the laborers' questions, and workmen must be informed as to the problems of business and industry. I surely hope, therefore, that it will not be long before progress is made toward a better understanding. One of our greatest troubles of the day is our lack of knowledge as to the duties of others' occupations.

I wish to thank you for conferring upon me the honor of being your President for the year 1919.

HANDLING OF GOVERNMENT'S DEMONSTRATION ORCHARDS.

W. F. KYDD, TORONTO.

At the present moment the Government has five leased orchards for demonstration and experimental purposes. They have been used more for experimental work than for demonstrations; very few of the fruit growers have visited these orchards. There are 1,350 trees in these leased orchards. There is one orchard in Prince Edward County, one in Simcoe, one at Whitby, Ontario County, and one in Lambton, and one in Norfolk.

All kinds of sprays and spray pumps have been used in these orchards. All manner of cultivations have been carried on, including fall and spring ploughing.

There are 215 trees in the Whitby orchard, and the house divides the orchard in two, making it a long narrow orchard. We ploughed the middle of the orchard and left the two ends not ploughed. One was mulched and the other clean cultivation, and one end of that orchard is very much better than the other. The north end is far better land; it has been well fertilized with barnyard manure, and the grass was cut and left on the ground. There is very little difference in the crop where it was cultivated where the land was good, but on the poor land it made quite a difference; there is a marked difference in the vigor of the trees. That indicates to me that one kind of land will give you good results without cultivation, and another kind of land must have cultivation. I would go so far as to say that I think 99 orchards out of 100 should be cultivated in order to get the best results, but I do know of some orchards where they are making a great success and not cultivating. If you can get all the manure you want, cultivation is not necessary, because you can keep the moisture in the land by the use of manure. We have

tried clean cultivation, and we have left a strip alongside of the growing tree of four or five feet on each side. We have them growing in sections ten feet square and eight feet square, and I could see no difference in the vigor of the trees, or the quality of the fruit, where it was clean cultivation and this strip of sod left on each side; therefore if I had a big commercial orchard of trees in full bearing I would not plow within four or five feet of the tree.

The orchard at Whitby is one of the worst orchards in the Province to keep free of scab; because it is surrounded by a wind-break of high spruce trees, and the moisture stays on the apples very late in the forenoon. If any of you have a new spray material that you want tested, we will try it on that orchard. A wind-break is good if it is far enough from the trees, but I would like to have a wind-break that I could set up one day and take down another.

The orchard at Collingwood was a good one when we took it, and we have had good results. It has paid us very well, and we have had a great deal less trouble with insects at Collingwood than we have had in this locality.

We took the most neglected orchard we could find in Lambton County; it had not been pruned for twelve years. We asked the owner what he would take for the orchard. He thought a little while and then said \$150 a year. He said that was as much as he got out of it, and he had to haul the apples to the evaporator. For the last four years the Department has cleared \$500 per annum off that orchard. I cannot tell exactly what we will make off it this year, but we have something like 300 barrels of apples. Part of that orchard is cultivated and part not cultivated; but there is no doubt in my mind that the most vigorous trees are in the cultivated portion.

The orchard we have in Prince Edward Co. has been rather interesting to me, and it is becoming interesting to the people of the county. It is about two and a half or three miles from Wellington. When it was leased about five years ago, the tree tops were all gone with canker and they were dying fast. We leased it for six years, and the first thing we did was to cut off all that cankerous wood. We have had next to no crop from that orchard up to this year; and we have 450 barrels this year. They are really good apples, and came off 200 trees. The apples that we picked this year are all off wood that we have grown in that orchard, and that is going to be a good orchard. The people in that locality have come to the conclusion that it pays to take care of an orchard.

You would be surprised at our being asked to go into Norfolk County, but you would not be any more surprised than we were. We always looked upon Norfolk County as an example, and I can tell you now that if it had not been for Norfolk we would not have many apples at this exhibition. The orchard we took in Norfolk County belongs to the President of the Norfolk Fruit Growers' Association. He had been a very sick man for a few years, and his son went to the war and left him without any help. The orchard had not been given very much care, and it required a good deal of attention the first year. Last year it did not make us any money, but we came out even. We are going to have a thousand barrels of apples off that orchard this year.

What have we done to get these crops of apples? We have manured them, we have pruned them, we have sprayed them, and we cultivated them, and sometimes we thinned them. If there is one thing that the apple orchards of this country are suffering from, it is lack of food. What could you do with a pig or cow if you did not feed it? Mr. Watson, of Dixie, has some of the finest apples ever grown, and he sells them in Toronto, and he is just coining money, and when he brings a load

of apples into Toronto, he brings back a load of manure. We are going to manure this orchard in Norfolk County every year for three or four years. We give big bearing trees 400 lbs. of barnyard manure per tree. We are not putting it within five feet of the trunk of the tree. There is no benefit derived from putting the manure near the trunk of the tree. The old trees must be pruned if you want good sized fruit. Give them tankage, and you will get color, some people say; but I do not believe there is anything that will color apples except sunshine and lack of cultivation; these are the main things in coloring apples. I know trees that are 25 and 30 feet high. I do not want high trees. I want to bring them down to 22 feet. Do not bring them down all in one year; take off a little at a time.

A number of fruit growers are finding fault because they do not get good results from spraying, but that is because they do not half spray. I know one man who has a power sprayer, and he does not stop his team. I can't spray in that way.

If you have not used the gun, then buy a gun this spring, and if you have a big orchard get a machine big enough and strong enough to keep the gun going; get it strong enough to put out 200 gallons of liquid in 30 minutes.

I believe cultivation is much more easily carried on if you plow in the fall. I believe in fall plowing. I would not go closer than within four or five feet of the tree. I would stop cultivation somewhere about the middle of June or first of July. Sow some crop in the orchard. Some one told me that there was nothing that would give as fine a finish to the apple as buckwheat. I do not know as to that, but sow anything you like.

When you have a heavy crop of apples I am sure that you should thin them. We sent some men down to thin one orchard, and they lost us money by not thinning them enough. It will cost you money to thin the orchard, but it will just save you that much money when you come to pack the apples.

Q.—You did not tell us when to stop cultivation? A.—I am going to stop cultivating next year on the 1st of June. We thinned the orchard at Whitby one year, and we packed 96% of No. 1 apples.

Q.—Did you find any burning after spraying with the gun? A.—Yes, we got burning by spraying with the gun. Tell me who does not get it. The reason we got it was because we held the gun too close to the tree. If you get a gun that is easily handled you will not have that trouble.

Q.—What kind? A.—I have no preference. There are seven or eight guns on the market, and I advise getting one that you can move rapidly from the stream to the mist, and keep away from the foliage at least four feet. The only objection I have to the gun is that we are all tempted to use too coarse a spray.

Q.—What is the best spray solution? A.—I want to use lime and sulphur and arsenate of lead.

The orchards of Ontario are in a sad condition, and no one can be blamed for that, because during the past five or six years the farmer could not get any help on his farm. A number of small orchards are going out of commission, and I think we should try and do something to keep these orchards. I believe that one hundred apple trees are easily worth \$250 to \$300 per annum. There is big money in these little orchards. If we do not put our shoulders to the wheel this apple industry is going to be a thing of the past. Some one will say the young orchards are coming on, but I doubt if some of them will ever bear the way they are being cared for. I think we should take care of the orchards we have and get the results that we should from them. It can be done, and it is being done. If I were a young man I would plant fifty acres of apples this spring, and I would consider

that I was doing a very wise thing for my children. You are not going to get the price you are now getting for your hogs all the time, and if I were a farmer I would buy a good farm with an apple orchard on it. If you have cows you have to get up at five in the morning to milk them, and the pigs will be squealing if you are not there to attend to them. In the cold weather you do not have to attend to the apple trees, and there is big money in an orchard that is properly looked after. I know orchards of only thirty-five trees that have paid \$3 per tree for a number of years.

MR. FLEMING: I see there is a grant made for demonstration orchards. Is the money made out of these orchards deducted from the grant?

MR. HODGETTS: The money received is all turned in as revenue and does not increase the amount available for this work. This year the orchard at Simcoe was visited by a great many people; it received more attention than the other four. The orchard at Whitby has not been visited by as many people as we think should have visited that orchard.

MR. BUNTING: Would not it be possible to have a field day once a month, and have the officials there that day and try and get the people out to these orchards?

THE CHAIRMAN: The suggestion is good. They have the same thing in New York State each year. Many farmers have visited the orchards that we do not know about. Some have told me they have been through the orchard and seen the wonderful work that was being done. We have got to carry this educational work to the producers in order to get results.

THE COMMERCIAL VARIETIES OF APPLES OF CANADA AND THE UNITED STATES.

W. T. MACOUN, DOMINION HORTICULTURIST, OTTAWA.

In the vast territory covered by Canada and the United States, where the climates range from Arctic to tropical, there is a great diversity of vegetation and a great variety of edible fruits, and most important of all the fruits is the apple. It is grown in every Province of Canada and in every State of the United States, and, while in Canada the number of trees grown in the coldest parts of the coldest Provinces is very limited, so in the United States the number of trees which are grown in the hottest parts of the hottest States is also limited.

The apple succeeds best in a moderately warm or a moderately cool climate, but some varieties will withstand great cold and others will succeed in great heat. The hardiest varieties of the colder parts are those which withstand extreme cold, the hardiest varieties of the warmest parts are those which withstand extreme heat. In some parts of Canada and the United States the growing season is so short that only those varieties of apples requiring the shortest season in which the apple matures fruit can be successfully raised. Again, other varieties require such a long season of warm weather that it is only in the warmest districts where apples are grown that they reach full development. Crimson Beauty requires but a short season, without much warm weather, to ripen; whereas the Winesap and Newtown Pippin will not mature thoroughly except in the warmest parts of Canada, as, even if the season is a long one, unless there is much high temperature to properly mature these fruits they cannot be very successfully grown. Thus, just as the

banana and orange require higher temperatures than the apple, if they are to mature, so different varieties of apples require different amounts of heat to bring them to full maturity. Thus, also, some varieties do well in a short relatively cool season; others do best in a long relatively cool season. Some varieties which only require a short season where the summers are hot do not reach their fullest development where the summer is cooler.

It has been found that there are about ninety varieties being recommended by growers in different parts of Canada and the United States, although, if all the varieties advertised by nurserymen were included there would be considerably more than this, and there are some doubtful ones which we have not included that might perhaps be.

We have divided the varieties according to their season into 13 summer, 18 autumn, 21 early winter and 38 winter sorts. Some of the summer apples are autumn sorts in the coldest districts; the autumn varieties, early winter; and the early winter, winter; but they have been classified according to how they keep in Ontario, or where a certain variety is specially noted.

SUMMER VARIETIES.

There are the fewest good varieties among the summer apples than of any other season. This is because varieties which will keep have been most sought after. The summer apples ripen at a time when the farmer is very busy harvesting his field crops, and they were not profitable for him to grow; and as it is only comparatively recently since apple growing became a specialized industry, there has not been time for many good commercial summer varieties to be found, originated and introduced. The varieties of summer apples which are being planted are Duchess of Oldenburg, Yellow Transparent, Red Astrachan, Crimson Beauty, Williams Favorite, Red June, Starr, Lowland Raspberry, Benoni, Early Harvest, Charlamoff, Blushed Calville, and Beautiful Arcade.

The Duchess of Oldenburg is the great outstanding summer apple. It is planted in nearly every apple district from North to South and from East to West. It withstands great cold and great heat. It is a good bearer and a good shipper, and the fruit is attractive in appearance, and in some places as much money has been made out of this variety as any other of any season. Yet it is not good enough in quality for a dessert apple at a time of year when nearly everyone wants an apple to eat.

Yellow Transparent is earlier than the Duchess, and it is an early and heavy bearer, but it is a difficult apple to handle, as it ripens unevenly and is easily bruised. It also is grown over a wide area, being one of the leading varieties in Georgia as it is in Ontario, and where it does not have to be shipped far has proved quite profitable. It, like the Duchess, is a poor variety to begin the season, as it is too acid and not good enough in quality for dessert.

The Red Astrachan has been grown in America for between eighty and ninety years, and at one time was much more popular than it is to-day. It is a handsome apple, but the fruit is usually very uneven in size, ripens very unevenly, and scabs badly. It apparently requires a warm season for best development. Georgia and New York States are the only States which report it as one of the leading apples.

The Williams, or Williams Favorite, originated in Massachusetts about one hundred and seventy-five years ago. Its value as a commercial apple has been more appreciated in recent years because it is an attractive red apple, is good in quality, and comes into bearing early and is productive. It does not, however, ripen

until late in August or early in September, and another variety is needed to open the season. It is thought highly of in the States of New Jersey and Delaware, and does well in the Annapolis Valley.

The Crimson Beauty must now be referred to. If the Crimson Beauty were better in quality and a better shipper, here would be a prize indeed. As it is, it is proving a profitable variety, we believe, to a few who have bearing orchards of it. This variety was originated by the late Francis Peabody Sharp at Woodstock, N.B., but outside a few orchards in New Brunswick and a few in Nova Scotia it is practically unknown, yet one grower has made it well known in the Annapolis Valley. Its chief merit is in its extreme earliness in colouring. At Ottawa, where we have many hundreds of varieties bearing, it is the first red apple to colour. In 1918 it was coloured at the end of July, and was quite ripe before the middle of August at Ottawa. It, like most of the other early varieties that are planted, is too poor in quality to start the season with, and something better is needed. It is acid and has practically no flavour. It is a poor shipper and must be handled carefully for best results. At Ottawa and at Macdonald College, Que., where it is being tested, it has not borne well so far, though trees have been planted about twelve years.

Red June is a popular summer variety in the South-eastern States. It is of solid red colour and good in quality. Grown at Ottawa, it is uneven in size, most of the fruit running below medium to small. It ripens at Ottawa early in August, but the fruit remains in good condition until October. The flesh is firm, and this variety is a good shipper.

The Starr is a large yellowish-green apple of good quality that is thought well of in the State of New Jersey. We have not seen this fruiting in Canada.

The only State or place where Benoni is mentioned as being a commercial variety is in Illinois. It is attractive looking and of good quality, but runs rather small for a commercial apple.

Early Harvest, at one time a popular yellow apple, is mentioned in Kansas, but, although this is one of the earliest sorts and one of the best in quality, owing to its unevenness of size and poor shipping quality, it is grown almost altogether for home use, and is not widely planted for this purpose as it is very subject to scab also.

There remain four Russian varieties which are very hardy and very useful in the colder parts of Canada and the United States. All of these have fruited in Southern Manitoba. They are Charlamoff, Lowland Raspberry, Blushed Calville and Beautiful Arcade. Charlamoff is one of the most reliable and profitable summer apples at Ottawa. It is somewhat like Duchess in outward appearance but longer in shape, and the quality is good for dessert purposes. It deserves more general planting. It is highly regarded in Minnesota. The Lowland Raspberry is a highly coloured apple, mid to late August apple of good to very good quality. Owing to its tender flesh, it is a poor shipper, and the birds disfigure and destroy a large number of the fruits. Blushed Calville is earlier than Yellow Transparent and much hardier. It is a pale yellow apple with a blush, a poor shipper, but because of its great hardiness is valuable on the Prairies. Beautiful Arcade, also known as Repka Kislaga, and by several other names, is a very hardy yellow sweet apple valuable for the coldest parts.

It will thus be seen that the ideal summer apple is still to be found.

Of apples originated at the Experimental Farm, Ottawa, the following summer varieties are mentioned out of a large number which have been originated there,

and it is hoped that some of these will become prominent commercial sorts some day. They are in order of ripening in August: Rupert, Forerunner, Melvin, Battle, Galetta, Medford, Melba. The Melba is the best of these, and very promising.

AUTUMN VARIETIES.

If a vote were taken among Ontario fruit growers the Wealthy might be given first place among the autumn varieties of apples, but if it were taken in some other part of Canada, or in certain of the United States, the Gravenstein would be considered the outstanding variety. Perhaps the best way of getting over the difficulty is to say that, while there is but one outstanding summer apple, the Duchess of Oldenburg, there are two predominant autumn sorts, the Wealthy and Gravenstein.

The Wealthy is probably more widely planted than the Gravenstein, yet, while the latter is not found in the colder parts of Canada and the United States, where apples are grown commercially, the Gravenstein is grown in nearly all of the great apple centres of the more temperate and warmer parts. It is very popular in Eastern America, and it is also popular in the extreme West. The Wealthy, however, can and is grown to a very large extent where the Gravenstein succeeds, but there are many places where the Wealthy grows where the Gravenstein fails. The Wealthy has much to recommend it. The tree is hardy, it is an early and heavy bearer, too heavy unless the apples are thinned; the fruit is of good size if thinned, handsome in appearance, and good though not of the best quality. The fruit, as a rule, scabs little or none in most places where it is grown. It ships well for an autumn sort. Its chief fault is that it drops badly, but if well thinned this weakness is much lessened. It is a leading variety in most of the more Northern and Eastern United States and in every province in Canada except the Prairie Provinces, where little fruit is grown. It is a fruit of the more temperate and cooler parts of America rather than the warmer.

The Gravenstein is the apple which has made the fruit of the Annapolis Valley famous. It must not be supposed, however, that because the Gravenstein has made the fruit of the Annapolis Valley famous that the best Gravensteins in America are grown in the Annapolis Valley. Very fine Gravensteins are grown elsewhere, and it is certainly one of the best of the autumn varieties in Ontario and British Columbia as well. The Banks, a highly coloured sort of the Gravenstein which originated in the Annapolis Valley, has become quite popular there.

It is surprising how few other autumn varieties there are which are widely planted in America, although there are about eighteen which are planted more or less.

Alexander will, perhaps, come next, but what a drop there is between Gravenstein and Alexander. This variety has been planted in the past because of its large size and handsome appearance and hardness of tree. But the plantings of it are getting less each year as it is not good enough in quality.

Blenheim is little grown outside of Nova Scotia, where it succeeds exceptionally well. It is grown to some extent in Ontario and in New York State, but is not now mentioned as a leading variety in any of the States.

Fall Pippin is a fine old autumn variety that is still considered a leading sort in Connecticut, and Georgia, and in California, Oregon, and Washington, and is highly regarded by some growers in New York State and in Ontario.

Maiden Blush was at one time widely planted, and was a very popular autumn apple due to its very handsome, delicate appearance and good quality. It is not very hardy and is not grown in the colder fruit districts. It has to be handled very

carefully, as it bruises easily. It is a popular apple in the State of Illinois, and seems to succeed well through the Middle West.

The six varieties mentioned, namely, Grayenstein, Wealthy, Alexander, Blenheim, Fall Pippin and Maiden Blush have been more generally planted than any of the others.

Twenty Ounce (Cayuga Red Streak) is popular in New York State, and is a large handsome apple, valuable for cooking.

Dudley is popular in New Brunswick and is become favourably known in other parts of Canada and in Minnesota. It is about the same season as Wealthy, is larger, is handsome in appearance, is of good quality and does not drop as badly as Wealthy. The tree is as hardy or harder than Wealthy. This variety deserves a trial where it has not been grown.

Fanny has a limited popularity and is inclined to run small.

Okabena is a seedling of Duchess of Oldenburg, which ripens just after that variety and resembles it somewhat. It is an early bearer and productive, and is, we believe, a coming apple for the colder parts of Canada where apples are grown commercially. It is doing well at Ottawa. It is highly regarded in Minnesota.

Golden White, also known as Winter Stripe, is a Russian variety of handsome appearance, and fairly good quality, which has proved very hardy and productive at Ottawa, and is deserving of further trial.

Langford Beauty is a handsome apple of the Fameuse type, which has done well in Eastern Ontario.

St. Lawrence, owing to its shy bearing habit, while of very good quality, is little planted.

The remaining varieties are valuable in the colder parts of Canada and the United States. They are McMahan, Antonovka, Patten Greening, and Peach of Montreal; Worcester Pearmain, an English variety, has done well in some parts of Canada.

Many autumn varieties have been originated at Ottawa, but eight of the most promising are Glenton, Ambo, Lipton, Joyce, Pedro, Thurso, Patricia and Hume.

EARLY WINTER VARIETIES.

It was difficult to know where to place some of the varieties mentioned in this group, whether to put them here or among the winter sorts. The varieties put in this group are those which remain in good condition in most apple districts from November until February.

The two outstanding early winter varieties to-day are the McIntosh and Jonathan. There are, doubtless, more trees of Jonathan planted than of McIntosh, but McIntosh is an apple which we believe is rapidly overtaking the Jonathan in quantity of fruit produced, and, as the McIntosh is a Canadian apple, we are naturally proud of the high place it is taking.

The first tree of the McIntosh apple was found along a road by John McIntosh, Dundela, Ont., in 1796. He planted it out in his orchard, and from that tree have come the thousands of trees growing in Canada and the United States to-day. It succeeds well over a very wide area in Canada and the United States, but is not so popular near the Atlantic and Pacific Coasts, where the air is relatively moist, as it is too difficult to control the apple scab in such places. The good points of this apple are hardiness of tree, a regular bearing habit, productive without being over-productive, fruit of good size, very attractive in colour, very good in quality, and, while not very suitable for packing in barrels, makes an excellent box fruit, which

commands a very high place. Very large plantings of McIntosh have been made in recent years in most of the Eastern States, and in the North-western States, Ontario and Quebec, and in some parts of the Maritime Provinces, and in the upper country in British Columbia. It is better in quality than the Jonathan, which may be considered its chief rival, although Jonathan has still the lead for quantity of fruit available.

Although the Jonathan originated in the East, it is the Middle West, West and North-western States which have made it famous, and it has been planted more extensively, perhaps, than any other variety in British Columbia. In the Eastern States and in Eastern Canada the fruit is not large enough, as a rule, and is not much planted. It is an early and heavy bearer, and the fruit is very handsome, being of a deep but lively red with patches of yellow often showing, which adds to its beauty. It is a seedling of the Esopus Spitzenburg, and, like that variety, has a high flavour. At present Western grown fruit of this variety meets a ready sale in the cities and towns of Eastern Canada and the United States early in the winter, when offered for sale in boxes.

The Province of Quebec is noted for its Fameuse, and, until the McIntosh became well known, was more largely planted, but, while the Fameuse is a fine apple, it is rapidly giving place, where it was once grown, to the McIntosh. The Fameuse is still considered a leading apple in the States of Maine, Vermont, and New York, and in parts of Ontario, where it is known as the Snow. It has not been a favourite near the coast.

Rhode Island Greening is one of the most important early winter apples, though we know that in Nova Scotia it keeps until near spring. It is one of the most highly thought of apples in the Eastern States, and in the State of New York comes second only to Baldwin in importance. It is also very popular in the warmer parts of Ontario, and, as we know, is very much grown in the Annapolis Valley. It is essentially an Eastern apple, and because of its excellence both for cooking and eating will, no doubt, continue for some time to be one of the best sorts to plant.

The Tompkins King is a well-known early winter apple and one of the handsomest in appearance and best in quality. This is a rather shy bearer in most places where it is grown, which is its main fault, but I have noticed that in Nova Scotia in the East and Vancouver Island on the West it is much more productive than in the interior, and thus seems particularly suitable for coastal conditions. It is only in Connecticut and New York States in the United States that it seems to be regarded as a popular commercial variety. It is now very little planted in Ontario, and is more popular in Nova Scotia than in any other part of Canada.

The Grimes succeeds very well over a large area and is one of the best early winter apples. It is a leading variety in the Middle Western States, in the North-western States, and to some extent in the Eastern States, and is one of the popular varieties in Virginia. It is not planted much in Eastern Canada, but does very well in British Columbia, particularly in the Okanagan. While it is a yellow apple and not so attractive in appearance as the red sorts, where it is well known it is in much demand owing to its very good quality.

The Wagener is, we know, regarded as a winter apple in Nova Scotia, but in most places where it is grown it does not keep well past mid-winter. It is considered a leading apple in Massachusetts, but in no other State is it mentioned as being an important variety. It has been planted to some extent in the North-western States and in British Columbia, but the tree has been found tenderer than Jonathan, it is

not as good a shipper as Jonathan, hence Jonathan is a more productive variety as a filler. It has been planted to some extent as a filler in Ontario, and, as we know, is largely grown as a winter apple in the Annapolis Valley. It is a very early and heavy bearer and on this account makes a good filler. The fruit is handsome in appearance and good in quality, but a rather poor shipper in most places on account of its tender flesh.

The seven varieties already referred to, namely, McIntosh, Jonathan, Fameuse, Rhode Island Greening, Tompkins King, Grimes and Wagener are, perhaps, the most noted of the twenty-one included with the early winter sorts.

Two other well-known sorts, though popular over a relatively limited area, are Ribston and Hubbardston.

Ribston is an important variety in Nova Scotia in the Annapolis and Cornwallis Valleys and is grown to a limited extent in other parts of the Maritime Provinces: it is planted to some extent in Ontario, though it is not an important variety here. It succeeds well in the Lower Mainland of British Columbia and on Vancouver Island, but in none of the United States is it mentioned as an important variety. On account of its being an English variety and well known there, the Nova Scotians are able to find a good market for this variety in England.

The Hubbardston is growing in popularity, although it is not widely planted. It is one of the important varieties in the State of New York and is highly regarded in Western Ontario. It resembles the Ribston somewhat in outward appearance, and is of good quality and in season in November and December in Ontario.

Delicious has become a noted apple in a comparatively short time. It is well advertised by the introducers, and its remarkably tender flesh, and mild but high flavour have made it a favourite with most people who have eaten it. As grown in the North-western States and in British Columbia it is a very handsome apple of large size and very good quality. Some of the Eastern and Southern States now mentioning it as one of the leading or promising varieties are Maine, New Jersey, Georgia, New Mexico and Virginia, and, no doubt, it will soon be called promising in other districts. Where the season is relatively short and cool it does not develop as well as in those parts where the season is long and warm, and unless it is highly coloured and well developed it does not compare favourably with other varieties more suited to the conditions. While the season of Delicious is early winter it keeps well in cold storage until the following summer. In some places Delicious is subject to water core and to the naturally tender flesh becoming too soft. The Delicious has not proved hardy at Ottawa.

The Yellow Bellflower, or Bishop Pippin as it is known in the Maritime Provinces, is, perhaps, more important in the apple districts of California than in any other part of America. There it is a popular autumn apple. It is mentioned as one of the leading apples in New Mexico, so that it is known far from the Maritime Provinces. It is still regarded as one of the leading apples in New York State.

The Ortley belongs to the Bellflower group and is grown to a considerable extent in the North-western States.

The Winter Banana is one of the newer early winter apples which deserves mention. It is handsome in appearance and very good in quality, but, as it shows bruises readily, it is not now being planted extensively as a commercial apple. It has been planted to a considerable extent in the North-western States and in British Columbia. It is not now mentioned as a leading variety in any of the United States.

Westfield Seek No Further is a popular variety over a limited area. It is very productive and of good quality, and the tree is hardier than some of the other early winter apples. It is inclined to run rather small unless well grown. It is still considered one of the important apples in New York State, and is well thought of along Lake Ontario in the Province of Ontario.

Sutton Beauty has not increased in popularity as rapidly as one might expect to judge by its handsome appearance and good quality. Vermont is the only State which lists it as an important variety, although it has been planted fairly extensively in New York State and, doubtless, in other Eastern States.

Wolf River has been planted instead of Alexander, where a large red cooking apple is wanted. It resembles Alexander very much, but keeps better. This variety is planted to some extent in the colder parts of Canada, where there are commercial orchards, and in Minnesota and Wisconsin especially in the United States.

Cox Orange Pippin. This delicious English variety is grown to a limited extent only in America. It is succeeding well in parts of British Columbia, and in the warmer parts of Nova Scotia. It is not very productive, as a rule.

King David is one of the newer apples which has come into notice mainly in the North-western States and in British Columbia. It is dark red in colour, of striking appearance, and good quality. It is not mentioned as promising in any of the Eastern States.

Opalescent. This is a large, handsome red apple of recent introduction. The tree is a good bearer. Young trees seen in Nova Scotia in 1919 were bearing heavily. The flesh of the fruit is, however, coarse. It lacks juice, and although well flavoured is not a high class apple.

Scarlet Pippin, a handsome Fameuse seedling, keeping better than Fameuse, is planted to a limited extent in Ontario.

Milwaukee is a winter apple of the Oldenburg type, and is useful as an early and heavy bearing hardy variety.

Hibernal is, perhaps, the hardiest apple planted in America, and is useful in the coldest parts. It is not desirable where other sorts succeed as the quality is low.

Two promising early winter seedlings of Northern Spy, originated at Ottawa, are Ascot and Rocket.

WINTER VARIETIES.

What is the outstanding winter variety of apple where the whole of North America is considered?

There are about ten from which to select the leader. They are Baldwin, Northern Spy, Winesap, Yellow Newton, Stayman Winesap, Rome Beauty, York Imperial, Stark and Ben Davis.

Of these, Ben Davis is undoubtedly the variety that has been most generally successful if we may call getting large crops of well coloured fruit and selling at a good profit is being successful, and most fruit growers would consider this to be so. Ben Davis has done well in the north, south, east and west in the United States, except in the very coldest parts. It has been grown profitably also in Canada, except in the coldest districts. The plantings of Ben Davis are, however, getting less each year in proportion to other sorts as, considering the enormous number of trees which have been set out of varieties of better quality than Ben Davis, growers are a little afraid that Ben will not be so profitable in the future as he has been in the past. Moreover, recent severe winters have been hard on

Ben, and many thousands of trees have been killed in the Middle West in the United States and in Ontario in Canada.

The plantings of Baldwin are confined mainly to the States east of the Mississippi Valley, to the warmer parts of the Province of Ontario and to the warmer parts of Nova Scotia, and over that great area an enormous quantity of this fine apple is grown. It might be considered the great staple winter apple of America. It is productive, handsome in appearance, and good in quality. It is one of the tenderest of the winter varieties, however, and it is useless to plant it where the coldness of a climate makes its success doubtful. To do its best it requires a warmer summer than it gets in the Annapolis and Cornwallis Valleys.

If the average consumer in Canada were asked which is the best winter apple he would unhesitatingly say Northern Spy. Northern Spy has acquired a reputation for quality in Canada and certain parts of the United States which would make other sorts envious if they were human. Like the Baldwin, however, the Northern Spy, though grown to some extent in the North-western States, is essentially an Eastern apple. It is one of the hardiest of the winter varieties and will fruit where Baldwin, Greening and King are winter killed. Many growers of Northern Spy, however, find that it is not one of the most profitable for them to grow, as there is a large proportion of wastage in the fruit apart from the fact that it takes so long to come into bearing, and if it were not for the great demand for it by consumers we fear that this fine sort would not hold its own among other sorts.

The Winesap, while not much known in Canada, is a very important apple in the South-eastern States, the Southern States, the Middle West, and in the North-western States. In Canada, the only part which seems to suit it is the most southerly part of British Columbia, where the summers are hot and relatively long. This variety is very good in quality, and we might say is to the south as a dessert apple what the Northern Spy is to the northern parts of the United States and to Canada.

The Stayman Winesap is larger than the Winesap, and just as good or better in quality and is rapidly taking the place of Winesap in some sections. It seems harder than Winesap and is being grown successfully where Winesap does not do well. It is an apple which should be thoroughly tested in the warmer parts of Ontario.

The Rome Beauty has become a very familiar apple in Canada during the winter in boxes from the North-western States, where this variety has come rapidly to the front. It is of good size, very handsome in appearance, and good in quality, though not as good as Northern Spy or Winesap or Stayman Winesap. While it is doing particularly well in the West, it is now one of the leading apples in the Middle West. It is also succeeding well in Virginia, Georgia and New Mexico. Doubtless, it will soon take an important place in more of the Eastern States. While planted to some extent in British Columbia, it has been little planted in Eastern Canada yet. It seems harder than most of the great commercial winter sorts, and is an early and heavy bearer. It is well worthy of a thorough test in the great apple districts of Ontario.

Yellow Newton or Albermarle Pippin is another variety which requires a long warm season for full development. It is one of the tenderest of the winter apples, and is grown mainly in the Southern States, in the North-western States, and to some extent in the warmest parts of British Columbia. The Yellow Newton on account of its firm flesh is a good shipping apple. It is very good quality, and is highly regarded in the Old Country.

Stark. The Stark apple is not mentioned by any of the States as being a leading apple. In Canada it has been more extensively planted in the Province of Ontario than anywhere else, and has proved a profitable variety there, as it is an early and heavy bearer. It has been planted to some extent in Nova Scotia also, and we understand is now considered one of the leading apples in the Annapolis Valley. The quality of the Stark, however, like the Ben Davis, is not good enough to ensure its permanency, and is too mild in flavour even for a cooking apple.

York Imperial is another winter sort which is confined mainly to the Southern States and to the Middle West. It is handsome in appearance, but the quality is not high. It is, perhaps, being more largely planted in Virginia than in any other State.

Roxbury Russet or **Nonpareil**. This variety is not an important apple outside New York State, Ontario, and Nova Scotia. The good qualities of the Russet varieties are not as much appreciated in America as they are in Great Britain and Europe, and if it were not for the export trade this fruit would probably not be so much grown in Nova Scotia as it is. It is one of the best keeping winter apples, and the quality is good to very good.

American Golden Russet is little planted nowadays. It has the reputation of being a shy bearer, and there is also only a limited demand in the home markets for this fine dessert sort.

Esopus Spitzenburg is one of the finest dessert apples, but does not appear to be a profitable variety to grow in most sections. It is not very productive and scabs badly in the East. It is still considered an important variety in New York State, but the Washington Spitzenburgs are those best known on the market, and they command a very high price.

The remaining winter sorts may be very briefly mentioned. **Gano** and **Black Ben Davis**, highly coloured strains of Ben Davis, have been planted to some extent, but are no better except in colour than Ben Davis.

Red Canada is a handsome winter apple of high quality, which is considered one of the best commercial apples for Vermont, and is highly regarded in Western Ontario, where it is increasing in popularity. It is also called **Steele's Red Winter** and differs from the Canada Red, which is grown in the Province of Quebec, which is a much inferior apple, the proper name of which is **Roseau**.

Akin Red is another highly coloured winter apple of very good quality, which, although not a leading sort anywhere so far as we are aware, has been planted to some extent in recent years. It seems to require a long rather warm season for best development.

Minkler is a prominent winter apple in the State of Illinois, and is met with to a limited extent in other parts of the United States and Canada.

Salome is one of the hardiest of the late keeping varieties. It is handsome in appearance, productive, and good in quality, and, while it does not seem to be an outstanding variety anywhere, it is well thought of in the North-eastern States and by some growers in Ontario. It is grown to some extent in British Columbia and the North-western States. In some districts it runs uneven in size, a large proportion of the fruit being too small.

Fallawater is a well known winter apple in Nova Scotia and Ontario and in the Eastern States, but is no longer extensively planted. It is not good enough in quality to compete with other better apples.

The **Wellington** apple, an English variety, seems to have found a place in Nova Scotia.

Blue Pearmain is an old variety, which is one of the hardiest winter apples, but usually does not bear enough to make it very profitable. It is found to a limited extent in the North-eastern States and all through Eastern Canada. It is of very good quality.

Ontario is an apple originated in the Province of Ontario, a cross between Northern Spy and Wagener. The tree bears young and heavily. This variety has done well in Ontario, in New York State and in Annapolis Valley, but it bruises so readily that it does not advance rapidly in favour.

Cranberry Pippin is a variety which has succeeded very well in Southern Ontario, but is too inferior in quality to be planted any more.

Tolman is still the principal sweet apple grown, and succeeds well in the Eastern States, in Ontario, and in the Maritime Provinces.

Paragon, sometimes known as Mammoth Black Twig, is a red apple of good quality, which has proven particularly suitable for the South-eastern and Middle West apple districts where Winesap is so well known. This is not the same as another apple sometimes known as Mammoth Black Twig, but more correctly Arkansas Black, which seems to be an important variety in Idaho, Texas and New Mexico.

Bethel, Scott Winter, Pewaukee, North Western Greening, and Canada Baldwin are all varieties which succeed in the colder parts of Canada and the United State, where the best winter apples do not succeed, but none of them are good enough even for these regions. Other varieties which have a limited adaptation or are grown over a limited area in the United States are Kinnaird, Willowtwig, Hero and White Pearmain, Sheckley, Terry, Yates, Hoover, Dr. Matthews and Red Texas. There are, of course, many others which might be mentioned.

Some promising winter apples originated at Ottawa. All seedlings of Northern Spy are Donald, Elmer, Bingo, Niobe, and Emilia.

While it has not been possible to describe in detail all the varieties mentioned in this paper, full descriptions of most of them will be found in the writer's bulletin on "The Apple in Canada," which can be had free on application to the Experimental Farm, Ottawa.

Which of all the varieties mentioned are recommended for Ontario? There may be a difference of opinion in regard to this, but, after correspondence and conversation with growers the following list was published in the writer's bulletin on "The Apple in Canada," and is practically the same as that recommended by the Fruit Branch of the Provincial Department of Agriculture:

DISTRICT 1.

Counties North of Lake Erie:

Summer.—Red Astrachan, Duchess of Oldenburg.

Autumn.—Gravenstein, Wealthy, Blenheim.

Early Winter.—Tompkins King, Hubbardston, McIntosh, Fameuse, Rhode Island Greening.

Winter.—Baldwin, Northern Spy.

DISTRICT 2.

Counties on Lake Huron and the southern part of the Georgian Bay and inland to Wellington and Waterloo Counties:

Summer.—Red Astrachan, Duchess of Oldenburg.

Autumn.—Gravenstein, Wealthy, Alexander, Blenheim.

Early Winter.—Tompkins King, Rhode Island Greening, McIntosh, Fameuse.

Winter.—Baldwin, Northern Spy.

DISTRICT 3.

Counties on Lake Ontario north to a line south of Lake Simcoe on the west and converging to Kingston on the east:

Summer.—Duchess of Oldenburg.

Autumn.—Gravenstein, Wealthy, Alexander, Blenheim.

Early Winter.—McIntosh, Fameuse, Rhode Island Greening.

Winter.—Baldwin, Northern Spy. Baldwin is too tender in some places.

Additional varieties suggested for trial, home use or local market for districts 1, 2 and 3: Yellow Transparent, Primate, Ribston, Swayzie, Tolman, Rome Beauty.

DISTRICT 4.

Counties of Wellington and Waterloo and the higher elevations in the adjacent Counties:

Summer.—Duchess of Oldenburg.

Autumn.—Wealthy, Alexander.

Early Winter.—McIntosh, Fameuse.

Other varieties such as Gravenstein, Blenheim, Ribston and Northern Spy will succeed in the most favourable parts, but it is safer to top-graft them.

DISTRICT 5.

From near Kingston, north and east to latitude 46 deg. and along this line west to and including Manitoulin Island, and south to District 3:

Summer.—Yellow Transparent, Crimson Beauty, Duchess of Oldenburg, Langford Beauty.

Autumn.—Wealthy, Alexander, Dudley, McMahan, Okabena is promising.

Early Winter.—McIntosh, Fameuse, Wolf River.

Winter.—Milwaukee, Bethel, Scott Winter, Scarlet Pippin succeeds well near the St. Lawrence River, but it is hardly hardy enough inland.

Additional varieties suggested for home use:

Summer.—Lowland Raspberry.

Autumn.—Peach of Montreal, St. Lawrence.

Winter.—Pewaukee, American Golden Russet, Tolman.

While a few winter varieties are recommended for this district, extensive plantings of them are not advised.

DISTRICT 6.

North of District 5:

Summer.—Blushed Calville, Lowland Raspberry, Duchess of Oldenburg and Charlamoff; the two latter being autumn varieties in this district.

Autumn.—Golden White, Antonovka, Wealthy, Hiberna, McMahan, Longfield and Patten Greening—all of which might be called early winter apples in this district. Where apples will not grow, the following crab apples should be tried: Whitney, Transcendent, Florence, Martha and Hyslop. Where the climate is most severe, the hybrid crab apples originated at the Central Experimental Farm, Ottawa, such as Silvia, Jewel and Charles, should succeed.

LESSONS FROM THE ORCHARDS AT MACDONALD COLLEGE.

PROF. BUNTING, MACDONALD COLLEGE, ST. ANNE DE BELLEVUE, QUE.

The orchards at Macdonald College, in the Province of Quebec, are located twenty-one miles west of the City of Montreal, and comprise thirty acres, consisting of twenty-four and a half acres of young apple trees, twelve and thirteen years of age, an acre and a half of American plums, some cherries and pear trees, and some older apple trees from twenty-five to thirty years. The standard apple trees have been planted 33 feet x 33 feet with fillers the one way consisting of early bearing apple trees, sour cherry and plum trees, mostly of the Americana group.

Over 100 varieties of apples, including a number of Mr. Macoun's named seedlings have been planted. Of this number of varieties 12 are represented by forty or more trees of each—12 by 20 or more trees and the balance by from one to four trees.

The soil is a fertile clay loam overlaying a rather stiff clay, and underneath this at varying depths is rock. The land has been fairly well drained with tile, and for the most part dries up in the spring much earlier than adjoining undrained land.

CULTURE.—The orchard has been well cultivated and planted with intercrops, consisting of potatoes and other vegetables, strawberries, some raspberries and clover. During the first five years of the orchard the intercrops occupied a large part of the total area, but as the trees increased in size this area was decreased in order to permit of cultivating the tree rows without seriously interfering with the limbs of the trees. By the tenth year approximately only one-half the space between the tree rows was intercropped, and after this time, as the orchard was commencing to bear more heavily, it was thought wise to discontinue intercropping, although some parts of the orchard have had crops between the tree rows during the past three years. The intercrops have been quite satisfactory and profitable, and would be recommended for any young orchard where an adequate market can be found for the produce. Potatoes, beans, beets, carrots and turnips, cabbage, squash, tomatoes and early short varieties of corn, strawberries and raspberries have all been used extensively.

Clover planted as a catch or cover crop in June on one occasion was allowed to grow the following year for hay, but on account of the difficulty and cost of getting it out from among the trees it could not be recommended, although an excellent growth was secured. The result of the fertilization of the ground for these intercrops and their cultivation has stimulated a heavy wood growth, and many of the trees have not come rapidly into bearing, but now that they are larger are capable of bearing heavier crops, and the intercrops provided the return during the early period of the orchard. The intercrops, in addition to providing a revenue, considerably reduced the cost of cultivating the orchard, as the cultivation, instead of being solely charged to the orchard, is largely charged against the intercrop.

The result on the fruit of the heavy feeding and cultivation of these intercrops has been to greatly increase its size, and on the whole it has not been so well coloured, although of good colour, as plots where cultivation was stopped late in June or early in July.

In later years of intercropping and especially when the trees were carrying considerable fruit, the work of spraying did much damage to these crops, in that they were tramped on and driven over by the spray wagon and team, and the men, in quickly moving about with a line of hose also did much damage.

COVER CROPS.—A number of different kinds of cover crops are sown during the latter part of June or early July each year. At first these crops were sown along the strip occupied by the tree row and where they would not interfere with the intercrops. As the area in intercrops was decreased the cover crop was proportionately increased, so that by the tenth year a strip approximately 16½ feet wide was in cover crop. Since then each year a cover crop has been sown over the entire area of the orchard where other crops were not grown or weeds were allowed to grow.

The cover crops grown may be divided into three general classes: first the legumes, including clovers, vetches, horse beans, and cowpeas, of which the first two are most satisfactory, but of late years have been too costly for seed for orchards not particularly in need of nitrogen. Second, broad leaved non-legumes such as rape and buckwheat; these have the advantages of producing an abundance of humus and are not so costly. They smothered weeds by their rapid and strong growth but hold the dew and rain and make it very wet under foot at harvest time and difficult to gather windfalls. The third class are the grains, including oats, rye and winter wheat, of which the two latter are the best, producing an abundance of humus, and not having the decided objection of buckwheat or rape in being so wet underfoot. A fourth class may be referred to as weeds, which have the advantage of costing nothing for seed, and usually give a good covering to the ground. At the present writing we have a piece of chickweed which is ideal from the standpoint of protection and the orchard. In the areas allowed to grow up in weeds we handle it like the rape, and cut it once with the mower about the end of August or sometimes before the harvest. The objection to this is the injury to windfalls by punctures in the skin of the fruit in falling on the stubble.

FERTILIZERS.—Fertilizer experiments have been carried on in one block of over seven acres, including apples, and some cherries and plums used as fillers. In these tests there are check plots with no fertilizer, stable manure used heavy and light, and various combinations of commercial fertilizers, including an excess of each of nitrogen, potash, and phosphoric acid. In this block, intercrops were grown continuously for ten years, and the land was moderately fertilized with stable manure over that part of the centre of the tree rows occupied with crop. During the last three years no intercrops were grown. The cover crops during this time have consisted of clover or rape. Up to the present no difference in either wood growth or fruit production as the direct result of the use of fertilizers either manure or commercial, has been noted, but it must be borne in mind that this block has good soil, and has been well cultivated and seeded to cover crops which undoubtedly has added a large supply of humus and available plant food to the soil. Whether or not marked differences in regard to yields will later occur as the result of fertilizers remains to be seen.

PRUNING.—The orchard has been annually pruned, and on the whole rather heavily. This heavy pruning has been due in part to the rapid and strong growth of the trees. One of the chief difficulties in connection with pruning has been the large number of main limbs that have been allowed to form from the trunk in the early years of the orchard. In some cases there are from ten to a dozen quite close together, and this has been a source of weakness in the trees, resulting in cracking and splitting in the main crotches, and it has been a favoured place for the development of a canker. This injury has later resulted in the breaking out of some limbs, and following the winter of 1917-18 considerable canker developed. Three to five main limbs well placed on the trunk are sufficient for the main scaffold of

most apple trees. Lighter prunings on the whole would likely have resulted in earlier crops on some varieties.

TOP-GRAFTING.—Some top-grafting on hardy, vigorous trees, such as Arabka and Longfied, has been done, and where the varieties used for the graft are hardy they have done well. However, a number of varieties not recommended for the province on account of lack of hardiness and including Spy, Baldwin, King, Gravenstein, etc., were used, and these were entirely killed out in the winter of 1917-18, although Arabka trees came through fairly well.

SPRAYING.—We have had an abundance of disease and insect pests to contend with, including scab, canker, oyster-shell, codlin moth, bud moth, cigar case bearer, tent caterpillar, fall web worm, canker worms, cherry slugs, aphids, etc. These have all been successfully kept in check, with the exception of the canker, which has made some headway. The apple scab and insect pests have presented no difficult problem, but are a great drain on labor during a busy season, and an item of considerable expense in growing good fruit. For the main part of the orchard the spraying has consisted of the use of lime sulphur in combination with arsenate of lead, the paste and dry form, and latterly of arsenate of lime. In addition, considerable spraying work has been carried on to test other combinations or recommendations, and new materials. A power sprayer has been used for all work except in small plot sprayings, and during the past three years the spray gun was used for applying the liquid.

We have found the lime-sulphur satisfactory for scab, as an orchard spray, and have not noted under our conditions the loss from dropping of the newly formed fruits as the result of lime-sulphur spray injury reported from Nova Scotia. The lime-sulphur is just as satisfactory as a scab control as Bordeaux mixture, but in connection with the use of Bordeaux mixture we have, from time to time, had Bordeaux injury or russetting on such varieties as McIntosh and Fameuse. In addition lime-sulphur has been a cheaper spray than Bordeaux mixture during late years. As there is no San Jose scale to contend with we have dispensed with the lime-sulphur 1.003 sp. gr. spray for some years, and are using the semi or delayed dormant lime-sulphur spray of 1.001 sp. gr. for first spray. Several brands of arsenate of lime have been used extensively in combination with lime-sulphur without any ill effects from burning, and it has proved a satisfactory control for eating insects and is considerably cheaper than either of the two forms of arsenate of lead.

In using the Spragun we have found it a great labour saver, but during the past year, which was favorable to the development of scab, we have had considerable scab develop in the cavity or stem end of the McIntosh, while nine-tenths of the area of the fruit was absolutely free. This injury is attributed to the use of too coarse a stream under high pressure, driven in from the Spragun from the ground, when the apples were small and on their sides, or the calyces pointing outwards, and the spray has not entered this part of the cavity. Later when the apples were larger and pointing downward dew or moisture would lodge in the calyx and favored the development of scab on this part untouched with lime-sulphur.

The dusting machine has not been used, but has been observed in other orchards. It is a great labour saver, but in the writer's opinion should only be considered an adjunct to the spraying equipment in the large orchards. This past season one orchard has been inspected in which the dusting machine was depended upon to control the scab, but on account of high winds prevailing throughout the spraying period the dust could not be put on satisfactorily, with the result that

the crop was very scabby and wormy. In this orchard the dusting machine gave excellent results last year.

THINNING OF FRUITS. This is one operation that is little practised or understood in the east, and one that should be taken up more generally in connection with some varieties. The writer has practised the thinning of Yellow Transparent, Duchess, and Wealthy extensively for some years, and to some extent on other varieties, and considers it essential to the production of high class fruit of these varieties. The thinning has been done on comparatively young trees which could be reached with six and eight-foot stepladders. The cost has been low, ranging from 15 to 30 cents per tree, but it is felt that this cost is more than compensated for by the smaller number of fruits to handle in picking and packing. In the process of thinning, which is done in late June, all defective or ill-shapen apples are removed and also those apples that are not well placed as far as receiving a fair amount of light. Only one apple is left to a spur, unless the crop is very light on the tree or some limbs, when two apples are left. If the spurs carrying fruit are quite close together as is frequently the case with these varieties, all the apples are removed from some spurs. We do not attempt to thin to a definite distance apart, but prefer that the apples be from four to six inches apart on any one branch. The result of thinning has been to greatly increase the uniformity, quality, and size of the fruit; and it is much better colored because all fruits have ample room for good light. We believe we have more regularity in bearing on these thinned trees as the direct result of thinning, although there are many other factors influencing the bearing habit. There has also been little breaking of limbs on the thinned fruit as compared with heavily laden unthinned trees. The satisfaction in handling this high class fruit should count for something as well as the higher prices obtained for the box or barrel of such fruit.

VARIETIES. In handling an orchard of so many varieties, many difficulties have been experienced in marketing the fruit. The market requirements are for a large output of uniform fruit of known value. Good fruit of known value will sell readily, but unknown varieties of good quality are more difficult to sell, and will not bring such good prices, while little known varieties of mediocre merit should be discarded from the commercial plantings. The local adaptability of the district to different fruits as well as market requirements should be carefully studied in determining the varieties that should be planted. Too many varieties is a mistake except probably for local markets; however, it is well to have five or six varieties which will aid in distributing the work of picking, packing and marketing over a longer season and also aid in ensuring some crop in off-seasons for some varieties. The McIntosh and Fameuse are our two leading varieties and are similar in many respects, but the marked differences in other respects should be noted and studied by the intending planter. The McIntosh will fall readily as it nears maturity, and in cases of high wind many apples may go to the ground. The Fameuse hangs to the trees well, and may be left until after the McIntosh are harvested.

The Fameuse has been very seriously injured as the result of the winter of 1917-18, and thousands of old and young trees have been killed out throughout the province. But we are not discouraged, for the Fameuse has stood the test and been the leading variety for a hundred years.

Our best and most profitable varieties are Duchess, Wealthy, Alexander, McIntosh, and Fameuse (Snow). We can grow those to perfection and have an un-

limited market for them. Of winter apples we have so few of sufficient hardiness and merit that it is questionable whether any of them should be recommended for extensive commercial plantings in Quebec.

One of the most difficult factors to contend with in the Quebec orchards is the prevalence of canker. The Fameuse is quite subject to it, and the McIntosh is more resistant. Probably we will have to check the tree growth earlier in June to allow of better ripening of the wood before severe weather sets in, for it is largely through frost splits or cracks on the trunk and larger limbs, especially in the crotches, that the disease gains entrance.

In conclusion I would like to say that from my experience and observation in Quebec as well as in Ontario I am very hopeful and optimistic of the fruit industry. However, we have not been making the progress that conditions would justify. The British Columbia fruit grower is sending in his fruit to our home markets, and taking the cream of the prices. The dealers openly say they prefer to handle the western fruit on account of its uniformity, good size, high quality, and splendid pack, and to-day the buying public are demanding this type of fruit. The fruit grower of the east must become a better grower than in the past, and will probably have to specialize and extend his orchards to regain his home markets, and capture new ones. Success in fruit growing is dependent largely on the following factors, and I would emphasize them in the following order: Varieties, suitability of soil conditions, cultural methods, pruning, spraying, and attention to those other details such as thinning, picking, packing and storage, all of which help to make the difference between good crops of high-class fruit and poor crops of indifferent fruit.

THE NIAGARA DISTRICT GRAPE GROWERS' ASSOCIATION.

J. C. LIVINGSTONE, GRIMSBY.

My knowledge of the grape growing industry in the Niagara District goes back thirty-five years, and with a general knowledge extending back for forty-five years. Thirty-five years ago it was not a usual thing to sell grapes for 15c. and 20c. per pound. The general crop was sold at 10c. and 12c., and if there was a big crop it was sold at 8c.; that would mean 56c. a basket. The grape growers were alarmed when grapes dropped to 6c. per pound, or 42c. per basket. I remember a few years ago that I sold grapes for 8c. per basket; the basket cost me 3c., and the picking 1c., which left me 4c. for the crop and drawing to the station. In the meantime a great acreage of grapes had been planted, because it was thought that grapes were easy to grow, and they would grow on any kind of land; but it has been proven that the best cultivation and spraying and pruning are necessary to get the best results.

I will commence with 1907 to 1910 when grapes were sold at 10c. to 12c. per basket, and I want to bring you up to this year when they were sold to the wine companies for as high as \$65 per ton, and in special cases to the Italian buyers for as high as \$90 per ton. Previous to 1910 the grape grower was not working for himself at all, he had no control of his own business, he was working for the middle man or retailer. For several years I kept account of what grapes sold at in the Niagara District, and what they were sold at in Owen Sound, Sault St. Marie, Winnipeg, Brandon, and Regina; and I found that the grape grower would be

getting 4c., 5c., and 6c. for a basket; and the dealer or middle-man would get from 1c. to 5c. on a basket of grapes, and that the retailer would get 20c. on each basket. The retailer was making more money on a basket of grapes than the dealer and grower put together.

That condition was brought about in a most peculiar manner, the grape growers are scattered about from Hamilton to Niagara. There was great competition for the trade in the west; dealers would send men out there and make contracts for the season. In order that they might have the grapes to ship, the dealers had to make contracts with the growers. The dealer went about in July and August, and made contracts with the growers. The cheaper he could buy the cheaper he could sell, and his profit came in between the buying and selling price, and crops were contracted for as low as 11c. per basket. You can see the small price he obtained when he had to pay 4c. for the basket and 1c. for picking. It was impossible at these prices for the grape grower to do anything more than live, and it is doubtful, if he kept a set of books, that his accounts at the end of the year would show any profit. In 1916 prices had advanced to 16c. In 1918 there was a very light crop, and that was the first year that prices began to show a reasonable comparison with the prices of other commodities. Although everything else had gone up, grapes still remained at a low figure until 1918. In 1918 the wine men came out and offered \$40 per ton for grapes. Then they raised the price to \$45, and \$50, and \$55. That brought about a scarcity of grapes, and it was that fact that caused the grape growers of the Niagara district to look into the market for grapes. They found out that when we were getting \$55 per ton for our grapes the grape growers in New York State were getting \$110 and \$115 per ton for theirs. It was that fact that gave rise to the present Grape Growers' Association.

That brings me up to the point of the aims and objects of the Association. They are as follows: First of all to bind all the grape growers of the Niagara district together. There is an Executive Committee composed of two representatives from each locality. The object is to have two local associations in each township. Where there is a shipping point they will meet at that point. The president and secretary of that Association become members of the parent association, and members of the Executive. By meeting through the winter we will impress upon our members the great necessity of giving more attention to the vineyards through better pruning, better cultivation, and better spraying and better fertilizing. There are some of the finest vineyards in America in the Niagara district, and we want to bring them all up to that standard. Twenty-five per cent. of the vineyards are grown up with weeds and rubbish. Next we want to become so strong as an Association that we can deal with the wine companies and with the buyers as an Association. We want to be able to say to them: we will produce the grapes for you and we will improve the quality, and we want to deal with you so that we can make some money, and so that you can make some money, and so that the public can get our grapes at a reasonable price. If a few growers sign contracts to sell grapes at 15c., it forces all the other growers to sell at the same price, because the dealers cannot compete with the men who have the contracts at 15c. Not only that, but we find that the buyers in the west seek by every possible means to have the prices cut to the lowest possible notch. What we want is to have the Association say to its members, "Don't sign contracts; the Association will endeavor to get a fair price and a uniform price for everybody." The trouble has been that at Jordan there would be one price, at St. Catharines another, and at Grimsby another. The men in the west and

the buyers would hold up one district by the price in another, and so on, the results being that the price was forced down in all cases.

Growers have been induced by the dealers to cut their grapes too early in the season, and they have put on the market green grapes; that may be a good thing for a few dealers, but it is not a good thing for the business. We will try and see that the grapes are put on the market in an attractive manner and grapes that are fit to eat, and in that way we will increase consumption. What we want is a uniform price, make arrangements with the wine companies for so much and make arrangements with the dealers for so much, and then the dealers will go to the west on equal terms. Our object is not to boost prices or make the public pay more, but our object is to boost production, to give the dealers and the wine companies all the grapes they want at a reasonable price, and to give the consumers good grapes at a reasonable price.

We are going to make a study of the distribution problem. We find this situation: On the Toronto market grapes will be very low in price; we will find the same condition at Montreal; but if we go up to Listowel or Goderich or Seaforth the people up there are unable to get any grapes. The dealers will tell you "That is not our fault, we quoted prices to the retailers in these towns." There are cases where the public have to pay 75c. for a basket of grapes in the west that actually left the grower at 15c. There must be something done to put men in the district to solve the distribution problem. We have either to take hold of the U.F.O. system of distribution in the east or the Grain Growers in the west, or the dealers must take hold of it and solve it for us.

You would think it strange that grapes could be bought for \$55 per ton in Ontario, and that in the State of New York they were getting \$110 per ton. The wine men over there thought wine would be exempt from the Act, and they were willing to pay high prices, but when they were prohibited the price went down. In the meantime some of the buyers from the other side were brought over here, and they were surprised beyond measure to see our vineyards; they simply held up their hands in amazement. Now it was strange that although they were only fifty miles away they had no idea of our grape growing industry. We would have sold a great many grapes to these buyers this year but for the fact that their market went bad over there, and as a result, instead of taking over 200 cars, I don't think they got over 50 cars of grapes from us. They started off paying \$80 per ton, and it went down to \$65. We are going to make a bid for the early grapes on the American market, as our grapes ripen ten to fifteen days earlier than theirs. That being the case it appears to us that there is a market in the United States for our early grapes. They have the two and four quart package, and we have only the six quart package. We believe that if we put some of our early grapes on the American market in two and four-quart packages we have a ready sale for them. The market in 1918 for the two-quart package was 27c., and the four-quart 38c. to 42c., when we were selling our six-quart package at 30c. and 35c.

Another object we have in view is to endeavor to bring about a better understanding with the wine makers. What we want to do is to stop the St. Catharines buyer using the Winona grower as a lever to keep down prices in St. Catharines and *vice-versa*. We want uniform prices, better production, and we want better distribution, so that the consuming public all over Canada will have a good supply of grapes at a reasonable price.

MR. SHEPPARD: I live on the Niagara River, and I started this thing going. You will remember that our friend Mr. Fleming took me to task in 1911 because I

said something about Free Trade. I am glad to know that our friends at Grimsby have wakened up and have found that there is a market in the United States. Our canning factories were paying 7c. per pound for cherries when they were paying 10c. and 12c. in the United States.

Mr. Livingstone will have to do a lot of work among the grape growers with regard to handling grapes properly. We should try and get our growers to handle them in the same way that they do in the U.S. The difficulty is that our people have not yet learned the necessity of taking the trouble to get their stuff up in an attractive manner. I have a telegram in my pocket from a firm in the United States which states that they do not want our grapes at any price because our growers will not take the trouble to pick the grapes properly and pack them in proper condition. We must look after all these little details if we expect to get good prices.

MR. FLEMING: I am as strongly against reciprocity to-day as I was when I spoke to Mr. Sheppard in 1911. I am still of the opinion that an alteration in the duty on peaches would be ruinous to the peach industry of this country. I am sure Mr. Livingstone would not like to see the duty taken off grapes?

MR. LIVINGSTONE: You bet I would not. I have studied that free trade business very thoroughly during the last three months. If they are short in the United States we can afford to pay a duty of \$16 per ton, but if we have no surplus we have none to ship. If they had a surplus they would simply glut our market. Our small surplus would have no effect on their market, but their big surplus would ruin our market.

MR. JOHNSTON: I would like to see more of our men go over there and study their conditions.

THE RELATION BETWEEN THE GROWER AND THE CANNING FACTORY.

ARTHUR CRAISE, ST. CATHARINES.

During the past season the canning factories were falling over one another in securing contracts for the growing of tomatoes for 1919. It was thought that tomatoes were going to be a poor crop, but it turned out to be a banner year, and we only got started delivering when the canning factories said, "We are short of cans and we can only take a limited amount of your tomatoes," with the result that hundreds of bushels of tomatoes rotted on the ground. The grower had spent his money for manure and he had bought or grown his plants. We said to the canning factories, "You have these tomatoes under contract, you have got to take them," and they pointed to a clause in the contract that said, "Anything that renders this factory not able to operate makes this contract null and void."

What could we do? To give you an experience my brother and I had in 1917. We made a contract with a canning factory for our strawberries. After some discussion we agreed on the price 8c. We had one patch that was an early variety, and for that reason we did not want to include that patch in our contract, and so we agreed to sell 400 crates. It turned out to be a wet season and the crop was small. We had estimated our crop at between 800 and 1,000 crates. We shipped 226 crates of the early berries, and when we saw that the crop was going to be short we started shipping to the canning factory, and our total yield was only 426

crates, so that we only delivered to the canning factory 200 crates. We felt that we had done our duty in the matter. At the end of the season we went to the canning factory at St. Catharines to get our money, and they said, "We cannot pay you full price for these; you have not fulfilled the whole of your contract, and we have had to go out and buy berries to make up for the unfulfilled part of your contract at an increased price. You have got to reimburse us for that." They asked us for \$114, which would leave us \$320. We consulted our solicitor and told him everything, and he said, "You have no trouble in winning out in a case of this kind." We took the case to court, and the judge said that nothing could be given in evidence except what was in black and white as to the contract, and that was that we sold 400 crates of berries; and after we got through we had only \$80, which was not a very big price for 226 crates of berries. You all know how the canning factories act. If there is a large crop they commence to find fault with your peaches or tomatoes; if the crop is small they will insist on your filling the contract to the last crate. If they cannot handle the crop they have a clause in their written contract that enables them to crawl from under. I do not think it is good business to sign a contract with a clause of that kind in it. The question arises, what is the remedy for this state of affairs? I claim that we should have co-operation among the growers, and we should make out our own contracts.

MR. LIVINGSTONE: We never have any trouble with the Dominion Cannery.

MR. CRAISE: We have got to get organized in a thorough way as fruit growers. I think the U.F.O. Government will be the thin end of the wedge in getting the farmers and fruit growers to organize, and I then think they will have some encouragement, and in my opinion they have very little now.

MR. LIVINGSTONE: The great trouble in the Niagara district is that the men there are interested in so many things, the peach grower thinks of nothing but peaches and the grape grower of grapes and the vegetable grower of vegetables.

MR. BUNTING: This matter has been going along for a number of years in a slipshod way, and the time has come when the producers should have something to say in connection with any contract that is framed for the sale of produce of the farm. I think a committee might be appointed by this Association to deal with the canners and secure a contract that would be fair to all parties. The tomato growers east of Toronto received 25c. per basket more for their tomatoes than did the tomato growers of Niagara district. Prices should be uniform, and this Association should take some steps to see that these things were all put on a proper basis.

MR. FLEMING: I think this committee should try and arrange more friendly relations with the canners. The canners are the best friends we have. I have no interest in a canning factory. This year I had a contract with the Dominion Cannery. They offered me a price of 61½c. per pound for my whole crop, which is equal to about \$1 per basket. There was no trouble, and they took all my fruit as it came along. I had a few small peaches at the end of the season, and they said these are too small, we will be able to give you only 6c. for these, and I was very glad they did that, and I was quite willing to take the lower price; it encouraged me to grow good fruit. For 13 years I have marketed my own fruit, and this year I accepted this offer and sold them in that way. Go into any first-class hotel in this province and ask for peaches, and what do you get? California peaches. They are swamping our market. If we would only grow good peaches for the canning factory it would help greatly in advancing the peach industry in this province.

MR. CRAISE: Supposing you had a large crop, would you like to be faced with that clause in the contract?

MR. FLEMING: Of course I see that things have not turned out well for Mr. Craise. I signed a contract for any surplus tomatoes I had, and I sent my early tomatoes to the market. They asked us at one time to delay sending in our tomatoes because the platform was all filled up, and they could not handle them at that factory, and they had to send them to another factory.

MR. RITTENHOUSE: The relations between the grower and the canning factory should be most cordial, yet I think that the contracts are too one-sided. In some cases where the local factory could not handle all the fruit or tomatoes that were offered, they took the produce and shipped it to other factories that could handle it. It was very difficult for the factories to get help this year.

MR. LIVINGSTONE: The contract should be so framed that the fruit grower would be protected when he did not have the fruit.

MR. BUNTING: You will fail to find anything in the canners' part of the contract in which he binds himself to do anything, but if you do not carry out your contract to the letter you are penalized, and that has been the trouble all along.

MR. SHEPPARD: I have been dealing with the canning factory in our district and I have never had any trouble. Some of the managers are splendid good fellows, and others of them are not, and they are apt to make trouble. I once took a load of tomatoes to a certain factory. I had been delivering them for some time, and one day a car load of officials from Hamilton drove up at the same time that I was delivering my load, and the manager asked them to get up on the load and see my tomatoes, and they said that if they were getting stuff like that at all the factories they would have no trouble; within ten days of that time the same agent tried to find some excuse for refusing my tomatoes. Three years ago they started out to sell, and they told the wholesale people: "You buy your supplies early, and anything we cannot fill we will refund you 15 per cent. on the price." They agreed to fill all the contracts up to 60 per cent., and anything between 60 per cent. and 100 per cent. they would refund 15c. At a certain time in the year they said: "We cannot fill any more orders, here is your 15 per cent., but immediately they jumped the price to the wholesaler 25 per cent. They gave him back 15c., and charged him 25 per cent. I think we should protect ourselves so that if, under weather conditions, we cannot carry out our contract we will not be penalized.

MR. FLEMING: I move that the question of the relations between the canners and the fruit growers be left in the hands of a committee to be appointed by the directors of the Ontario Fruit Growers' Association. The motion was seconded by Mr. Allen and carried.

ARE GOVERNMENT GRADES DESIRABLE FOR OUR PEACHES?

F. A. J. SHEPPARD, QUEENSTON.

This is a very big question, and I hardly know where to start. I am glad to see that the Fruit Commissioner is here from Ottawa. We work under different conditions in the Niagara district from what they do in different parts of the province or the Dominion of Canada. It is much more difficult to form grades for peaches than it is for apples or some other fruits. You all know that if you ship peaches to a market that is three days away they may not arrive there in perfect condition. Under the present conditions it seems to me almost impossible to establish a uniform grade for peaches. It is true that we might grade them accord-

ing to size, but size does not always count. We know that different soil conditions make a difference in the size. On another class of soil we will have a better color, but not as large fruit. I do not think at the present time it would be fair to the fruit grower to establish grades, because he would have to come up to some standard either as to size or color of the fruit. Owing to labor conditions a number of growers are not cultivating their orchards as well as they might. I think it would be wise for our inspectors and our Association to try and encourage the fruit growers to turn out good fruit and to pack it in the very best and most attractive manner, and that the top of the basket will represent the contents of the basket, so that the purchaser will know what he is buying. He will know that there is no deception being practised. I think it would be better to do that than to try to establish grades for peaches. The difference between our fruit and that from the west has been commented on. I know that the west is producing better fruit than we are as far as size is concerned, but I do not see how we can remedy that state of affairs. Their conditions are different to ours. They have a rainy season and a dry season, and in some places they have eternal sunshine, and the man who brings water down from the mountains, and who has sunshine overhead can produce a very fine specimen of fruit. I do not believe we are going to be able to compete with our California friends for a long time. We find that California fruit takes the preference over Canadian fruit in Ontario on account of the color. The Elberta peach, which is the best we have, will not have color and still be in a condition that it can be peeled with a machine. The Lemon Free peach is as yellow as can be and still firm. If we let the Elberta peach get so that it has color it will be soft and break down. I think that is largely the reason why the California peach is more in demand than our own. Mr. Fleming told us that the Dominion Canners docked him half a cent on his Lemon Free peaches, and that does not give us very much encouragement to go into the growing of this variety.

THE GRADING OF PEACHES.

H. FLEMING, GRIMSBY.

The peach industry is now one hundred years old. The first commercial peach orchard was planted by Mr. Dennis Woolverton, of Grimsby, who, in 1820, sold peaches on the Hamilton market. About thirty years later there were several commercial orchards in the Niagara district. From 1890 to 1898 the industry boomed and fell owing to a large quantity of poor grade fruit being thrown on the market. In 1914 the first shipments were made to Winnipeg. Shipments were made to Europe in 1909 and 1910 with more or less success. The industry cannot be said to have flourished during the war years. Many orchards were neglected through the scarcity of labor, and the trees have suffered accordingly. To those of us who have been so fortunate as to have been able to care for our orchards, there is a bright future ahead. If this optimistic forecast is to come true, however, there must be no lowering of the present tariff on imported peaches, and a Government grade of peaches should be established. This brings me to the subject on which I have been asked to speak: "Are Government grades desirable for our peaches?" The arguments which might be brought forward in favor of an established grade are too numerous to be mentioned at this time, the mere fact that as things are at

present, a peach grower is practically himself the judge as to what constitutes a No. 1 peach. Nearly every grower is of opinion that there must be a percentage of No. 1 peaches in his orchard. We find that the peach which orchard owner A. grades as No. 1 peach, orchard owner B. may be grading as a No. 2 or cull. Such conditions are not in the interest of the dealer, the wholesaler, the retailer, or the consumer, and incidentally it is ruining the peach industry in Canada, especially in the west. I am of opinion that there should not only be an established grade, but that the minimum weight of the peaches should be marked on the package. This is a large and difficult subject, and should be gone into very carefully by all parties interested. I have spent much time on the question, and for the sake of discussion and in order to obtain the views of my fellow growers, I will only mention one grade and would suggest that the established grade of a No. 1 peach be as follows:—

“No person shall sell or offer for sale any peaches represented to be of No. 1 quality unless such peaches are sound, of one variety, and of good color for the variety, free from bruises and other defects; the minimum diameter of the peaches shall be two inches, the grade and minimum weight of the package shall be distinctly marked on the package, also the packer's name and address. Ten per cent. of the peaches contained in the package may be below the requirements of this grade.”

While I have with me the Government standard eleven-quart basket, which will carry three packed layers of No. 1 peaches as above described, I have made no reference to the pack, as the probabilities are that the new Government standard of bushel basket will be more generally used in the future, and at the present time the heaped leno basket appears to be a legal package. If there is to be a great future before the peach industry it is necessary that we should give our trees more attention than in the past, have more enthusiasm and co-operation among ourselves, and be able to obtain healthy and reliable stock from the nurserymen. It is our duty, although it should not be, to see that our industry is fostered and protected by the Federal Government, that the literature issued by the Provincial Government in Great Britain is kept up to date; and that our representatives over there are the best men that can be had, in order that desirable settlers may be kept well informed as to the excellence of the climate of Ontario as compared with the damp and cold of Great Britain, and that it is not as is too often thought, a land of snow and ice, but a fertile land of sunshine, where peaches and grapes for commercial purposes can be grown in the open with profit.

MR. SHEPPARD: Do you think it is profitable to grow peaches as large as you state?

MR. FLEMING: Yes, I think so. I would like to grow a three-inch peach. I would like to see two grades, fancy and No. 1. The large peaches could be put in small baskets.

MR. SHEPPARD: The people would feel that it was a great hardship if they had to cull their peaches, owing to the labor conditions. They prefer to put them up as they do and sell them for what they are worth. We are hoping that in the near future labor conditions will improve, and then we will be able to cull the peaches and ship them in better condition. I do not think the time is ripe when we should tell the growers that they have to grade peaches.

H. L. CRAISE: I think if you force the grading of peaches on the average grower at the present time it will just have the effect of enabling the canners to buy them cheaper. I sold my entire crop this year, and I never had a more satisfactory season: they took them all. We will have to put our peaches on the market

so as to be able to compete with the other fellow. The pit of an ordinary peach will measure from three-quarters to an inch, and if you confine the size to two inches, all you will have left will be twice the size of the pit. I had occasion to go into the Welch plant this fall and measure the pit of a peach, and I found that the pit of the Crosby is only half the size of the Elberta. The pit of an Elberta was found to be three-quarters of an inch across and one inch long, and the pit of the Crosby peach was only half that size.

MR. RITTENHOUSE: It appears that there are two different opinions with regard to this matter. We are liable to get a very full crop this year, and if the canning factories cannot absorb the whole crop, we will have to have some organization such as the Niagara Grape Growers have so as to enable us to get rid of the crop. I want to say that the growers throughout the district are very much in favor of establishing a grade for peaches. They are only trying to put off the time, but my opinion is that we cannot start too soon and get the grade established. I do not think they would agree to come down to two inches for the No. 1 grade.

MR. BAXTER: Dominion Fruit Commissioner: We are always behind any movement to help the fruit growers along. I may say for the information of some who have not gone into the matter that in so far as the grading of peaches is concerned, British Columbia requested us to include them in our grades, and our present legislation will cover that, provided we include boxes in our list of enclosed packages. When we do that the present grading will include peaches. We just take the present definition of No. 1 grade and apply it to peaches. In British Columbia they pack altogether in boxes, and they ask us to go a little bit further and state definitely what would be the minimum size for a No. 1 peach. This year we increased the depth of the box so that 96 peaches solidly packed constitute a No. 1 peach; they must not be less than the minimum size of the variety, the same as we have provided for apples. There are a great many fruit growers who are grading, although it is not compulsory. We inspect them the same as apples or any other fruit, but we have not been insisting on their being all of one variety. We take yellow fleshed varieties, they are all included in one. We have not been as particular in enforcing that as we have been with pears and apples. It might be possible if we were confined to the shipping of peaches in six and eleven-quart baskets to state the minimum number that a six-quart basket could contain. Then comes in the question of leno covers. There is no standard for them, and there is a difficulty. We have very open minds in the matter, and will be very glad to get behind any movement that will help along the industry as a whole. I have been in favor of grading for a great many years, and I want to call attention to one thing I have discovered in non-grading, that the good apples work their way to the top of the box.

MR. CAREY: I find in the city of Toronto market that 50 per cent. of the growers are grading their peaches and marking them as such. There is a high-class trade in Toronto to whom money is no object, and they want the good stuff. By grading we get a more honest package. There are stores in Toronto that will not take the poor stuff at all, but if you send them good stuff they will pay for it.

MR. SHEPPARD: We have to judge by the money that comes back to us, and while I agree that it is a good thing for the consumer to have a good article, we do not now get the good money for putting it up. It is a fact that while we do spend double the time in packing these peaches, some other man gets the extra money for our extra work.

MR. J. M. CREEELMAN: During the time I was at Grimsby at the Cold Storage plant, and when I was in British Columbia, I had it continually thrown up to me that when they bought a car load of fruit from Ontario they never knew what was coming. They would buy a car load of peaches from Washington or California or British Columbia, and you know that there are so many boxes in that car, and so many No. 1; and you know there are 90 peaches or less in each box; or if they are No. 2 there will be from 96 to 112. Then if a customer comes into the warehouse for small peaches you give him a box of No. 2. I do not know how you are going to standardize in Ontario, as you have so many different packages and so many different varieties. That is why you will find California and British Columbia fruit for sale in the stores in Toronto during the season.

MR. FLEMING: I think the resolution committee should bring in a resolution as to the grading of peaches.

MR. SHEPPARD: I am heartily in sympathy with the movement.

THE FRUIT SITUATION IN LAMBTON COUNTY.

W. P. MACDONALD, PETROLIA.

I am pleased to know that this Convention is interested in learning the extent and outlook of the fruit situation in Lambton County. First, because in Lambton county fruit raising is a fair sized industry giving good promise, and secondly, because the fruit industry in Lambton is worthy of development, and has not yet reached a small fraction of the development or extent to which it will attain in the course of time. The fruit industry in Lambton is only in its infancy.

Lambton County is admirably situated for the growing of all tender fruits. The fruit section is situated along the northern portion of the county. This section of the county is on the same parallel of latitude as the section of country from Hamilton, St. Catharines and Welland, while the greater part of the county is situated below the 43rd parallel of latitude. The presence of a large body of water (Lake Huron), extending along the entire length of the north-western side of Lambton County, has a modifying and moderating influence on the climate.

The general slope of the land in the fruit section of Lambton County is northerly; a particular feature sought by all experienced fruit growers. A northerly slope retards unseasonable growth in the early spring and insures a greater absence of injury to fruit buds in winter than where trees are subject on a southern slope to the direct rays of the sun.

Throughout the fruit section there is what is known as the "ridge." This is a ridge of soil passing clear across the county. The soil varies from loam with a gravelly subsoil to straight sand and gravel. Peach trees do exceptionally well on the ridge formation, while on the loam soil fruits of all kind do well.

Along about the years of 1910 to 1912, and previous to this time, Lambton County fruit growers planted heavy to peaches. These trees were coming heavy into bearing about the time the war broke out. The result of war upon the fruit industry is well known to you all. This meant a shortage of labor. Therefore, orchards became neglected. Spraying, pruning, and the working of the lands between the trees was neglected. To again multiply the difficulties of the fruit growers during the spring of 1916-1917, curl leaf seriously attacked the peach trees:

in many cases defoliating entire orchards. The lack of spraying and the attack of leaf curl so weakened the vitality of the trees that during the cold spell in February of 1918 many peach trees were winter killed. This only happened in orchards that did not receive the required attention, spraying and cultivation, during the spring of 1916 and 1917.

The apple orchards in Lambton throughout the fruit district are in a flourishing condition. Many new orchards are now coming into bearing. These young orchards were interplanted with peaches as fillers. The peach trees have served their purpose and have returned a revenue, and are now gradually being removed.

The growing of strawberries, raspberries, and small fruit is followed to some extent in the localities near Arkona and Thedford. This branch of fruit growing is proving very successful and remunerative. New and larger plantations are being set out where farmers have their own labor or can easily secure labor for picking.

Lambton offers unequalled opportunities to the young farmer wishing to engage in fruit growing. In a great many cases farms can be purchased which include ridge land as well as loamy soil. This means a great advantage over people in sections which are specializing in only one or two branches of the fruit industry. In case of a failure in one crop, others are left to insure a revenue each year. In fact, only in isolated cases do we find a specialized fruit grower in Lambton County. Fruit growing is carried on in conjunction with mixed farming.

That there will be a revival of a period of peach tree planting in Lambton County in the very near future is my candid opinion. The quality and early maturity of Lambton's fruit is well and widely known. The success of and remuneration from fruit growing from the past experience is also an incentive to the fruit grower to enlarge his plantation.

Throughout this period of reconstruction, Lambton County should attract large numbers of prospective fruit growers. The climatic conditions, the soils of Lambton, the early maturity and quality of the fruit, the unexcelled marketing conditions, are second to none in any of the general fruit sections of Canada.

Lambton County requires to attract to the fruit section settlers who have a liking for fruit growing. There is all to be had in Lambton, coupled with cheap land, which goes to make a successful fruit growing district. The greatest drawback to the industry to-day is the lack of a class of citizen who desires to engage in fruit growing as the major portion of his farm operations. Lambton is not, as yet, a formidable competitor with the Niagara fruit district. The further development of the industry throughout the so-called fruit district is early anticipated by all fruit growers. Quantity will not be the outstanding factor; the quality and coloring of the fruit will not, however, be surpassed by fruit from other sections.

I would like to say a word in reference to the orchards in the older, or more general farming sections of the county. From observations in Lambton, Middlesex and Kent counties bordering on Lambton it is an outstanding fact that the orchards of our grandfathers are rapidly becoming a thing of the past. The days are past when every farm home has its supply of apples taken from the farm orchard stored away for the winter. The general farm orchard is dead, or is dying from neglect. I believe at this Convention something should be done to encourage the general mixed farmer to again plant out at least an acre or two acres of mixed orchard upon his farm. The having of an ample supply of fruit on every farm is an attraction to farm life, a business proposition, and adds to the health and prosperity of all.

SOME ORCHARD PROBLEMS.

PROF. F. C. SEARS, AMHERST, MASS.

I lived ten years in Canada, and therefore feel fairly well at home, and it takes a very small excuse to get me back again. I look back to the ten years I spent in Nova Scotia as the most pleasant years of my life. I am going to talk of things that will be of some help to you in this section of the country. Some ten years ago Prof. Waugh, of our Agricultural College, started an orchard about four miles from the orchard at Amherst, and I have told Prof. Butterfield, of our College, that the time is coming when the people will insist on the professors in agricultural colleges having a farm. We have too many men in our agricultural colleges who would starve to death on a farm, and the time is coming when in order to hold down their job they will have to have a farm, and know how to run it. We have this farm together. It is not a general farm, for we are, first of all, fruit men. I sympathize very strongly with what the last speaker said as to the value of an orchard on a farm, but I am going to talk from the standpoint of a fruit farmer, because that is the line in which I have been experienced. The first problem I have on my notes is the question of fertilizer. I do not know of a question that is more difficult for a fruit man to settle, or one from which the fruit men have had less help from the agricultural colleges and experimental stations. If you ask about the question of spraying, we have dozens of lessons that we have been taught by the experimental stations. In fact, most fruit men will admit, when you get them in a corner, that most of the things we have learned as to spraying have come from the colleges and experimental stations. It is the same on the question of pruning, but when you come down to the question of fertilization they have done us very little good. Very frequently the reports are conflicting, one station will say one thing and another station something else. The Geneva Station, in New York State, is one of the best we have on the continent; the Professor there does not think much of fertilizer. He makes the statement that if the block under experiment had not received an ounce of commercial fertilizer they would have been just as well off. The Massachusetts Station has had almost the very opposite result. There is on the college ground an orchard about 35 years old and they have run experiments in that orchard for about 25 years, and the interesting thing about it is that it was started by Dr. Gueston in an attempt to solve the effect of the different kinds of potash. They used muriate of potash, sulphate of potash and wood ash, and barnyard manure, but I do not think they helped us at all on the question of potash. The interesting thing to me is that the check block that did not get anything has not done as well as the block that got a little wood ash and some barnyard manure and some bone meal.

We have a rather lightish soil and we have to do things differently from what they do on their type of soil. We have come down to this, that we pay most attention to three things: we have got to have nitrogen on our light soil. We have a block of Wealthy apples on this light land and they have been in ten years; this spring they blossomed very heavily and I saw that we were going to get a tremendous crop, and I said the only thing we could possibly do was to fertilize that heavily. I went to a friend who was in the business and as a result of his advice we put 500 lbs. per acre of amophos; I don't know whether you can get that up here yet or not. It is a combination of phosphoric acid and nitrogen.

In addition to that we put on 300 lbs. of nitrate of soda and 200 lbs. of flue dust. We put it on in three applications. We first put on one-third and we did not think the trees were responding, and we put on another one-third, and then another. The result was that these trees bore a tremendous crop of fine large fruit and well colored. They would run considerably larger than the Baldwins, and they hung on the trees well for Wealthy apples. We sold \$500 worth per acre off the block. It was a block of land that we bought for \$25 per acre. Two years ago we sold \$300 per acre off that same land. And still some people think there is no money in orchard land.

Q.—What did the fertilizer cost per acre?

A.—We paid \$105 per ton for our nitrate of soda and we paid \$155 for the amophos. I think it was \$50 or \$60 a ton we paid for the flue dust. We know that it paid for itself, and that it was profitable.

Our farm is situated on a road that runs from Springfield into Vermont. It is one of the State Highways. We have a good local market, and we have sold between \$2,000 and \$3,000 right on the road side. We are selling everything we grow this year right on the place; we have not taken anything off the farm at all. We have unusual conditions with respect to marketing. Our soil is light and we have to fertilize heavily. Our problem is how to get sufficient fertilizer so as to make our trees grow on this light soil. If we can do that we are all right because we can get big apples of good color:

Q.—Did you do anything to add humus to that soil?

A.—No, we have 430 acres on the farm and 120 acres of orchard. One of our troubles has been the getting of humus and that is evidently going to be our trouble right along. This land we got for \$25 per acre was poor, light land with a scant sod on it. Last year we got a very scant crop of barley and this year we got a fair crop of millet. We have sown everything that we could think of that would give us a fair amount of material to plow under.

MR. KYDD: Tell us when you put on that fertilizer?

PROF. SEARS: The first application was made right after the trees blossomed, and the second one was within a month after that, and the third one was rather late, well towards the last of July, but we got plenty of foliage which, I think, is a good thing for next year.

Q.—Would you follow that practice if you could get barnyard manure?

A.—Let me put that off. I am coming to barnyard manure in the end.

Q.—Would you advise applying that fertilizer any earlier?

PROF. SEARS: I think it might have been put on before the trees blossomed. If I have a block of land that will not grow weeds I sit up at night and worry about it. We had one block that would not grow a good crop of weeds—we had one block that was sour—and I went to Professor Haskins of our college and asked him to test it. He told us it would take five tons per acre of ground lime stone to neutralize that land. I think that was one reason why we could not grow a cover crop. The last thing I did before leaving home was to call up the Boston & Maine and tell them to deliver two car loads of lime at the farm. The ground lime stone costs us \$4.50 per ton in bags or \$2.75 in bulk, and the freight rate is \$1.10, so that we can lay it down for about \$6 per ton. We have to pay \$10 per car for shunting. Last year we spent \$750 in fertilizer, and next year we are planning to spend \$2,000. I do not think there is anything we can do that will give us better results. We are using a lot of acid phosphate. Dr. Twitchell has had better results from acid phosphate than anything else, and he has been testing out a number of things.

The next item I have is barnyard manure. We have a lot of farm land on which we have grown hay and it has been profitable. It takes a good deal of team labor which helps us out when the team is not at work at anything else. We have not got any live stock at all except some hogs, and they seem to work in satisfactorily with the other work. We had a barn where we could tie up 25 head of cattle and we have tried to fill that barn with stock in the autumn. We have gone around the country and bought up dry cows. This year we have gone in with a cattle dealer, and he is going to buy cows with us. We furnish the barn and the roughage and he will furnish his own grain, and he pays us \$2 per week for the roughage. He will put in 20 or 25 head, and that, with the pigs, will give us a fine lot of manure in the spring. There is no question that the problem is what kind of live stock we ought to take on. There is no question in my mind that we ought to have some live stock. We have seen marked results where we have been able to use barnyard manure. If we could get all our blocks up to the point where they would grow weeds we should not worry very much. We have thought of two or three different ways of getting barnyard manure. One way is the way we are doing now, boarding cows for a live stock man. We get the manure and that is really all we are after. We also get fair sale for the hay, and it keeps one of our men busy in the winter. I believe the best thing is to ship in Western cattle from Chicago or Buffalo and fatten them during the winter: the trouble about that is that we do not pose as expert stock men.

My next item is tractors. We have a tractor that we do not think much of: I do not mean tractors in general, but this particular kind. I do think that a tractor is a thing that we must have in the orchard, and we are going to have a real tractor next spring. Mr. Mortimer, one of our trustees, who has a 150 acre orchard, does all his work with a Fordson tractor. There have been 22 men killed with tractors in the State of Michigan. If you strike a real heavy snag the machine turns over. I have broken many a wild colt on the Kansas prairie, and the thing is to get off before he falls on you. I am, therefore, inclined to get a Fordson and run the risk of our Polish boy getting off before it falls on him. The Cleveland tractor will not kill anybody, but they say the caterpillar treads wear out on certain land. A criticism I have had of the Fordson is that it has no governor on it, and if you have a raw driver on it he is apt to get you into trouble.

The labor question is a serious one on a fruit farm, and that is one of the reasons why we are going to get a tractor; because it will enable us to dispense with one teamster.

There is nothing that will get you into a worse corner than to be without help, or to have poor help. The question of labor is one that we have given a great deal of attention to, and I could talk for a whole hour on that question alone. We employ a number of men, and for that reason our position is different to that of a fruit grower who only employs one or two men. I think our problem is easier to solve than that of a man who only employs one or two men. We try to treat our men as neighbors and as human beings. We have four different farm houses in which we have the men quartered. We like a married man best, and we must provide him with a house. If he wants anything done to the house we do it for him. We do not let them grumble for a year before we do anything for them. I told the foreman the other day to go around and inspect the houses and see if there was anything to be done. We have a standing offer with the men, that any time they want paper or paint we will furnish the material if they

will put it on. They very often do things of that kind, and we try to give them good comfortable houses to live in.

We have been liberal in the question of wages, but we insist on good work. If a man does not work well we do not want him, but if he is a good worker we take care of him. We never dock a man for time off if he is sick. Last fall when the influenza was going around I had to run the whole show myself. Prof. Waugh had gone in for military work, and I tried to make my foreman, a young man of about 30 years of age, believe that it was just as patriotic to grow produce as to fight; but finally he came around to me and he said "Professor, I am going to enlist; I cannot stand people saying to me 'How is it that you are not in the army?'" That left me with not only my own job to run on the farm, but the college as well. I paid one man for three weeks when he did not do any work, and another man for two weeks. I think that is a good policy, it certainly has borne fruit in our case. We have men there that do not think anything of leaving the farm with a truck load of apples at three or four o'clock in the morning; and before we had the truck they would often leave the farm at one o'clock in the morning. Last year when I was alone one of the Polish men was handling the sales and he took far more interest in getting good prices than I did.

Just one or two things about handling them out in the field. Of course, if the men know they are going to be well paid and treated right they will have an interest in the work. We try to get them interested in what they are doing. For instance, if we have a man out pruning we try to get him interested in the number of trees he can prune in a day. We do not carry that so far as to have him do a poor job. I may go to Mike and say: "How many trees have you pruned to-day?" and he will say so many, then I will say: "Do you remember, Mike, that on this block last year we pruned so many?" And he will say: "Yes, we will have to try and do better to-morrow." Of course, I always go around looking at the quality of the work. Get them interested in the spraying, how many gallons of spray can they put on in a day, and sometimes I say: "You are putting on too much, better go more slowly." When they are packing it is just the same. Let them see that you know how much they did last year, and compare that with what they are doing this year, and it will be a big help. We always try to have our men so that we will know who is doing certain work. Start one man on one row picking and another man on another row, and then if poor work is being done you know who is doing it. In teaching at the college I will take thirty or forty boys out into the orchard and start them off in that way, and then I can tell what boy is doing good work or bad work and place the responsibility where it belongs. I do not like to see the whole gang—four or five men working on one tree, then if anything is done wrong nobody did it. "It just did itself," as the youngster said.

Q.—What do you pay in wages?

PROF. SEARS: Our average is \$2.75, and we furnish them with a house and feed their cow for them, and give them all the land they want for a garden. Wages have been going up steadily since we started down there. We are in the tobacco district, and it is nothing for them to pay their men \$4 and \$5 per day. We have one man that gets higher pay. Like all Polish people he has twelve or fifteen of a family, and they get a chance to work on the place picking fruit. He says he can save more money with us than he could when living in town, although he does not get as big pay. If we pay a man \$3 per day that means \$18 per week for him. Of course, as a matter of fact, there is not much Sunday work

in the fruit business. That is why it is easier to get men on a fruit farm than on a dairy farm.

Q.—What are your hours of work?

PROF. SEARS: Ten hours a day. I do not know how long we shall keep that up. A number of our men work a good deal longer than that. The man that drives the truck will leave the farm early in the morning, and he puts in more than ten hours a day. We recognize that, and give him a bonus now and again. Of course, we have a number of factories around us where the men work eight hours a day, but I think ten hours a day on a farm is as little as a man can get along with.

Q.—How do you find daylight saving affect you?

PROF. SEARS: We like it fairly well, but I understand that farmers as a class do not like it. I want to say a word on trucks: We are twenty-five miles from Springfield, and we are eight miles from Northampton. As a matter of fact we sell everything on the farm, and if we deliver at Springfield we get paid for delivering. Up to this year we got along without a truck, but this year we said we must have a truck, and after looking around we finally decided on a one ton truck. We can get eighty flaring peach baskets on our truck, as we have a special body. We can go to Springfield at the rate of twenty-five miles an hour and come back at thirty miles an hour. One day the foreman went to Springfield with a load and came back to the farm and stirred things up, then went to North Hampton and back, and then to Amherst, four miles from the farm, and he was back on the farm at four p.m. When we had the team it would go to Springfield and back in a day, but would not be much good the next day. The truck is too big to take out in the orchard, and we have planned to buy a small truck or second hand Ford, so that we will have a truck for getting things out of the orchard.

The next question is the question of nursery stock: I was interested to learn from Mr. Kydd that there was not much enthusiasm here in setting out trees. Most everybody is doing it in our section. In fact, we have got to the point where we cannot get nursery stock; they are all sold out. We do not get any quotations for trees under \$75 and \$90 per one hundred. On our farm we have narrowed down to four or five varieties; we have the Oldenburgh, which is harvested in August; the Wealthy, which is harvested in September; the McIntosh, the greatest apple ever introduced. Ontario has the credit for introducing it, but I think we can grow better McIntosh apples than you can. However, I am certainly proud of Ontario for introducing it. We are selling some of our apples this year at \$15.75 per barrel. Then we have the Baldwin and the Wagener. They are all red apples, and I have been converted during the last ten years into growing nothing but red apples. We have the Palmer Greening, one of the finest apples ever grown, and as good an apple in its way as the McIntosh, but it is yellow, and we can sell the McIntosh for \$15.75 easier than we can sell the Palmer Greening for \$4 or \$5. We have 500 Palmer Greening's on the place, and I wish they were McIntosh's. We are considering the Delicious. It is not a variety we can afford to grow generally, but the name of it is enough to make the average consumer think he wants it, and we are going to set out 100 trees next spring. The McIntosh will grow a more handsome tree without pruning than the Wealthy will if you sit up nights with it.

We planted 30 acres the first year and we bought 650 McIntosh apples. They grew beautifully, and every time anybody came within four miles of the farm we took them down and showed them this block of McIntosh apples. About the

fifth or sixth year some of them blossomed, and we used to stand around and watch these little apples grow. When I got back from my vacation the foreman called me up and he said: "I wish you would look at these McIntosh apples," and it turned out that none of them were McIntosh. So that I am personally interested in trees true to name. When we found out what the stock was Prof. Waugh, who knew the firm we bought them from, wrote down to them and they wrote a very nice letter, and said they would come right up and take the matter up with us. But just then their chief was running for the Legislature and he could not get away. We knew what Southern politics were, and so we waited and did not hear anything from him for a while. Then we wrote again, and he replied that the election had been pulled off and he had been declared not elected, but he could not get away until the re-count was over. We waited until we thought the re-count would be over and then we wrote again, and he replied that he had been counted in and could not get away. By that time we knew that he was not very anxious to come up, and we knew that a Northerner going into a Southern state and suing would not get anywhere, particularly when the man we were suing was in the Legislature, and that is the position it stands in to-day.

I am now interested in nursery stock true to name, and this is what we are doing: I don't know whether it is the best way out or not. We have tried two schemes: one is buying Northern Spy or something like that, and budding them. The trouble about that is that sometimes the buds do not take, and if you set out a nice block of trees and the buds do not take it is a big loss. We have gone from that to putting in a nursery, and then we can discard the trees on which the buds do not take, and that is working fairly well. A friend of mine is setting the trees as we do, and then whip grafting them, and he says they hardly miss a tree. If we could get a nurseryman who would be sure of his stock that would be all right.

I used to know years ago just what should be done in the pruning line. I could tell what ought to be done and how it ought to be done, but the older I get the less I know about it. I want to suggest to you two or three things that I think are sound: In the first place, the proper time for pruning. In a talk I gave the Nova Scotia Apple Growers I told them that I thought the proper time to prune was in March and April, and I still think that is good sound teaching from a theoretical standpoint. As a matter of fact, when you get into the orchard game to any extent pruning is one of the hardest things to do, and requires the most brains and the most experience. We have 120 acres of orchard to prune, and we do not have many men that we can trust to get into these trees. So we are starting pruning a little earlier and we are planning to start pruning our trees next month. If the orchard is small enough so that you can start pruning in March, I think that is the proper time, but when you have a lot of pruning to do and only a few men, then you must start earlier.

We have narrowed down to this, on our young trees from the time they are set out until four or five years, we prune as little as possible, but we do some pruning every year. I think it is a great mistake not to do that. When they get down to nearly bearing, then we prune them out to the shape we want them. In our McIntosh apple trees, up until they are six or seven years old we do not prune very much, but at that time, when they are bearing we prune them exactly as we want them. The Wealthy is a variety which tends to get small as it gets old, and we prune them very heavily, and give them thorough cultivation in order to keep up the growth, and so far we have been entirely successful.

MR. KYDD: How late do you keep up the cultivation?

PROF. SEARS: We plow our land in the fall or spring. We do as much as possible in the fall, because on account of our land being flat we cannot get on it early in the spring. I do not like to plow until the leaves are off. I always feel better if I have thirty or forty acres ploughed in the fall. We stop the first week in the month of July and put down our cover crop. In order to get a good growth of cover crop you must get it in as early as that. If I had my land rich enough I would not cultivate. The Marshall orchard in Massachusetts is the best I have ever seen, and he does not cultivate at all. He is just outside of a large city, and he gets street sweepings and scatters all over his orchard. He keeps his grass fairly close; he grows almost altogether the McIntosh apple, and he grows great big apples. He has a heavy soil.

We planted a thousand dwarf trees, and we are not very enthusiastic about them. On the other hand I have large sized dwarf trees at the college which are doing very well; they certainly have borne wonderfully. We have taken thirty bushels off six trees. I believe if a man had a commercial orchard with that kind of tree it would be a paying investment. The McIntosh, the Wealthy, the Oldenburgh, and the Baldwin have done best with us. We have one big firm who planted dwarfs, and they say if they were doing it over again they would not plant dwarf trees. I am not at all sure if I were planting again, but I would try the dwarf as a filler.

MR. KYDD: Would it be a good plan to cut in on the sides of our trees as well as the top; we have some very wide trees in this country?

PROF. SEARS: That would depend on the type of tree. We always make a severe pruning on the side branches of the Burbank plum. We have some varieties of apples that would require the same treatment. We prop up the trees when they are loaded. I do not believe you can thin the fruit off a tree down to the point where the tree will carry without any propping.

MR. ROBERTS: What is the height of the head of your trees?

PROF. SEARS: The bulk of our trees are two feet; we have some six and some eight inches. I have always thought that the two foot head was the proper thing. I think there is a lot to be said in favor of the low head.

Q.—Do you prune the roots?

A.—I have seen people cut off the roots and plant with a crowbar instead of a spade. I do not approve of that.

Q.—Is it better to head high?

A.—I think you get a better circulation if you head higher. I would expect to get more benefit from putting them further apart. At the present time I would not set anything under 45 feet apart, our land is not heavy and it will not grow a big tree.

Q.—What do you do about mice?

A.—All the way from nothing to good protection. We started in giving them no protection up to six or seven years, and I do not think we lost a dozen trees. Then one winter they came down on us, and we lost 150 trees, and since then we have been protecting our young trees. We use building paper altogether, it will only last one year. In the Marshall orchard they use heavy wire mesh, they have to have protection there all the time. I think building paper is as good a thing as you can use. If you want a permanent thing, I think wire is the best.

RESULTS OF SPRAY TESTS IN NORFOLK COUNTY.

W. A. ROSS, VINELAND STATION.

Last year the Dominion Department, with which I am connected, and the Ontario Fruit Branch, commenced a series of investigations on spraying, which will be continued over a period of three or four years. Our main object this year was to compare the Ontario spray schedule with two spray schedules which have given excellent results in the Maritime Provinces. The tests were made in a thirteen acre orchard in Simcoe County, the Government experimental orchard. We also made a test in a smaller orchard, of younger trees, at the Vineland Experimental Station.

The orchards were divided into three blocks, and were treated as follows: The first block was sprayed with the Bordeaux mixture 3-10-40. In preparing this we dissolved the bluestone over night in the usual way. We used builders' lime.

For the second spray we used, Bordeaux mixture 2-10-40, and arsenate of lime, 1 pound to 40 gallons, and for the third spray: sodium polysulphide (1 part sulfocide or 1 lb. sol. sulphur), arsenate of lime, $\frac{1}{2}$ lb.; hydrated lime, 5 lbs.; water, 40 gallons.

Fourth Spray: Bordeaux mixture 2-10-40, arsenate of lime 1 pound to 40. The next block received three regular applications of lime sulphur: First, lime sulphur alone, and second, lime sulphur and arsenate of lead; the third application, lime sulphur and arsenate of lead. This block did not receive any fourth application.

The results on the young trees in the Vineland orchard were very interesting. In the two blocks sprayed with lime sulphur solution, there was a slight amount, not in any way serious, of spray injury throughout the block: whereas, in the trees sprayed with Bordeaux mixture there was an absence of such injury. In the Duchess variety there was a very marked difference between the trees. The Duchess sprayed with lime sulphur, much of the foliage was singed, and then again much of it was small and curled, and in the trees sprayed with Bordeaux the foliage was large, and much more vigorous in appearance. I took several men through that orchard at Vineland and they spoke of the very marked difference.

In the large orchard, composed principally of Baldwins, Spies, Greenings, and Russets, there was very little difference in the condition of the foliage. Here and there in the lime sulphur block there was a slight amount of what we call gun injury, which I think was caused by a defective gun, which simply refused to throw a mist. We discarded this gun before we went on spraying the other blocks. Some men who went through this orchard thought they could notice a difference in the foliage, others saw no difference. In so far as the control of scab and codling moth and other insect pests is concerned, the one gave as good results as the other. Where we used the Bordeaux mixture in the case of Baldwins there was no scab at all. Where we used lime sulphur we had about 3 per cent. scab on the Spies and none on the Baldwins. Strange to say, we had more side-worms in the Bordeaux block, but I do not think the spraying had anything to do with it. In regard to the appearance of the fruit, especially the Baldwins, and to a lesser extent the Spies, on the trees sprayed with lime sulphur the apples had a finer appearance and the color was brighter.

The results we have secured from these experiments over several years leads me to believe that the following spray schedule is an ideal one for Ontario:

First Spray (with Oyster Shell Scale or Blister Mite): Lime Sulphur 1 to 8 or 1 to 9. Apply not later than the buds are bursting. With no San José Scale present and practically no Oyster Shell Scale or Blister Mite use: Lime Sulphur 1 to 20.

Second Spray: Lime Sulphur 1 to 40. Arsenate of Lead (powder) 1-1½ pounds, (paste) 2-3 pounds. Apply immediately before blossoms burst and when the little leaf tissues break out, or project out about a half inch.

Third Spray (usually the last spray in Ontario): Lime Sulphur 1-40. Arsenate of Lead (powder) 1 pound, (paste) 2 pounds. Apply immediately after blossoms have fallen.

MR. KYDD: What is the particular object of putting on Bordeaux for that second application?

A.—Because it gives you a nicer foliage, and then it is really a better fungicide than lime sulphur, and it stays on much longer. In certain sections it may be necessary to have a fourth spray ten or twelve days later, and here again I would use lime sulphur because of the fact that it gives you a much better finish than Bordeaux. It gives a brighter and snappier color to the fruit. It might be well for some of you to give this schedule a trial. To those of you who are well satisfied with the three sprays I would say go ahead with your usual formula. After all, our peculiar problem in Ontario is not so much what spraying material we use as how can we induce men to spray at the right time, and to spray thoroughly and systematically.

MR. KYDD: Do you just let a slow team keep on going when you are spraying?

A.—I stop until I have finished spraying the tree, and when I am through spraying that tree, I go to the next one.

J.—How long do you stop at that tree?

A.—I never keep track of the time.

Q.—Do you stop the horses twice or once?

A.—It all depends on the length of the hose.

Q.—Do you like to ride on the tank, or do you want a long hose?

A.—If you have a good spray gun you can do what you like with your spray material, and you can put it where you like.

PROF. CAESAR: For the San José Scale, you must be on the ground when putting on the spray because you have to cover the whole tree.

A.—I like to be on the ground, but there is the question of labor; you cannot get men to do it, and you can do a very good job from the tank. I do not think it is advisable to refer to any of these new materials until they have been tested for at least three years.

PROF. CAESAR: This year I was asked to co-operate with Mr. Ross on this matter. I have spent eight years on fruit, and I feel that it is time the vegetable men were getting more attention in the investigation of insect pests, and I wished to spend nearly all my time on vegetable tests. I am quite in accord with the results secured by Mr. Ross, and his recommendations are exactly as I would like to make them myself.

I believe that in this province we should use Lime Sulphur for the first spray; because we have in a good part of the province the San José Scale, and we have quite a lot of the Oyster Shell Scale. With that as a fact, and with quite a number dropping the first spray: if they use other than lime sulphur they will not get

results. I would strongly advise that first spray. It is the first spray more than any other that does the work. I went into three orchards where the first spray was put on and those orchards had clean fruit and foliage.

You cannot omit any one of these sprays and be sure that you are going to get the best results.

A great many men in spraying use too large an opening. By using a small opening you will use much less spray material and do a much better job, although it will be a little slower. Stand back well from your tree. I am satisfied that the second spray is well worth the trouble, and you will get better results from the Bordeaux mixture.

For the third spray I should put on Lime Sulphur, but do get it on at the right time, you cannot be too careful in watching the time. Two days might make all the difference in the world.

MR. KYDD: How many gallons will it take to spray a fully grown tree?

PROF. CAESAR: With the old nozzle I used to think that a great big apple tree could not be sprayed with less than ten gallons. Now, with the gun, I think possibly I can spray it with seven gallons.

A MEMBER: I am not a very large apple grower, I have only about fifty trees. I had a fairly good crop of apples this year. I sold them in St. Catharines, and the man I sold them to said: "Where can I get some more apples like these?" I recommended him to a neighbor, and he said: "That fellow sprays in such a way that he might just as well not spray at all." That is true, you might just as well not spray at all if you do not do it right.

THE CHAIRMAN: We have learned this morning that we must give our orchards the very best care. I think we should spend more money on our orchards than we have been spending the last few years. You can get labor if you pay enough and use the men right.

MR. KYDD: How much is it costing you per ton to lay the manure on your orchard?

THE CHAIRMAN: Very close to \$4 per ton. This year the manure will cost \$2.40 per ton laid down on the siding.

Q.—Do you think it is profitable to pay that for it?

THE CHAIRMAN: I do. We are afraid to pay the money, but we will get back \$3 and \$4 for every dollar we spend.

INTENSIVE STRAWBERRY CULTURE.

P. H. WISMER, JORDAN STATION.

Strawberries and raspberries have become the main source of my yearly income. There are few products that equal the strawberry for profit. I must confine my remarks to my own soil, as I have no practical experience outside of my locality. My soil is a deep sandy loam with 18 to 24 inches of gravel below the loam, and clay below the gravel at an average depth of about six feet.

LOCATION OF SOIL: Almost any location on the farm that will grow a good corn crop will do for strawberries provided the soil is naturally well drained. I would recommend the use of lime. My land has been limed occasionally for years. I prefer a one year old clover sod, with a heavy application of well rotted manure, say 40 tons per acre, plowed down about the last of August. This

should be treated as a summer fallow and plowed again late in the fall. I have also frequently used an oat stubble by manuring heavily, plowing down, and seeding with oats, which in turn were plowed down as a green crop late in the fall. Much, however, depends on previous preparation and on the richness of the soil for best results.

SPRING PREPARATION: As soon as the land is in good condition, and suitable plants may be obtained which have made sufficient start from their dormant state, we begin preparation by plowing. The land is then rolled and disked with the disk lapping half to leave the land level. The drag harrow is then used, followed by the roller which leaves an ideal surface soil to set the plants in.

MARKING: A field marker of proper width, such as is used for corn, is the quickest way.

The matted row system is giving largest returns, the rows being 3 feet 6 inches and 4 feet apart. Plants are set at 20 to 24 inches in the row.

PLANTS: Select the best row in your one year old patch, digging up the whole row, using a close tined fork. Select only the vigorous plants, discarding the smaller ones and plants with the dark roots. We never clean the plants, considering it a useless and possibly harmful practice. We avoid unnecessary handling. The strawberry plant is quite sensitive to sudden changes of temperature and excessive moisture. In Lincoln County, we do our planting about the first week in May, conditions being favorable. the most popular method of planting seems to be with a spade. A man and a boy are employed to do the work. The man takes the spade, pushes it into the ground at an angle of about 45 degrees, pressing it forward until the opening is sufficiently large for the boy to place the plant, holding it firmly until the spade is removed and the soil firmly pressed around the plant. Great care should be taken to have the crown of the plant just at the surface of the ground. Past experience has proven to me that plants set by hand in a light furrow have made a much better start than those set by the spade. Two men will plant just as fast by hand as by the spade.

CULTIVATION: Cultivation should be started as soon after planting as possible, and continued once each week and after each rain to hold the moisture. All blossoms should be hand picked. The weeds should be removed as fast as they appear. It is important that all the first runners be laid and held in place by covering with a small quantity of earth, placed back of the terminal bud. I would recommend the use of phosphoric acid in some form where heavy applications of manure are being made.

My largest yield was obtained by the use of basic slag, 500 to 600 lbs. per acre, and bone meal 500 to 600 lbs. per acre, applied on the matured row in the latter part of the summer about the last of August. To restore a patch for a second and third year, all weeds should be removed as fast as they appear so that the patch is clean when the picking season is over. We plow a furrow off one side of the row leaving it the proper width. Coming back the other side is barely edged to straighten it, the row being left about 10 inches wide. The ridge is then cultivated down. The refuse may be taken off the patch, or it will disappear with cultivation. The following year a furrow is plowed off the row on the same side as before. By this method the patch is being moved on new soil and your plants are still only two years old and should be more free from weed seeds than when you started.

I want to call your attention to three facts: Never mow a strawberry patch; never burn a strawberry patch over; never harrow a strawberry patch; if you would

have the largest returns. The plants will not regain normal vigor after these operations. The leaves are the lungs and food factory of the plants. They cannot thrive without them. The man who assists nature most gets most returns.

Surface drainage should be well looked after. For mulch, I have always used heated compost. We use the spreader for covering the patch.

YIELDS: My yield this past season was 1,226 crates from 2 9/10 acres or about 11,414 quarts per acre. My average yield, however, one year with another, is about 8,000 quarts.

Q.—I understand you to say that you do not take up your plants until they start to grow?

A.—I believe that strawberry plants should be transplanted in the dormant stage. Every other tree is taken up in the dormant stage. But very often if you plant them in the dormant stage in a soil like mine they get a sudden check and then they will stand still; therefore I always wait until they make a start.

Q.—Did you ever try planting in the fall?

A.—No.

Q.—What varieties do you grow?

A.—I formerly grew the Williams, but I now have the greatest acreage of Glen Mary.

Q.—Is that for local sale?

A.—The greatest proportion of our berries go to the canning factory.

Q.—With regard to renewing old plantations, your system sounds all right in theory? Can you keep an old patch going continuously?

A.—I have not tried it long enough to tell myself. That depends on the location, the surface drainage in particular, and the richness of the soil, and provided no weevil got into the roots. If no insect pests got in, I fancy they would keep good for three or four years. I picked a second year patch this year and got more than I did last year, and they look as if they will do better for the third year.

Q.—I happen to be a neighbor of Mr. Wismer, and we feel proud of his success in growing small fruit. Could you not give a shorter rotation that would bring about the same result?

A.—I want to tell you that the backbone of the whole thing is intensive manuring and intensive preparation.

Q.—How soon after plowing down a strawberry bed would you plant it again?

A.—I told you in the start that I was continually changing my plans. I am just now turning over a new leaf in strawberry culture. Four years ago I was crowded out with chick-weed. I kept men in it continually from the time spring opened until the strawberries were ripe, and we picked 1,024 boxes from an acre. Then I plowed it all up, and I sowed it to wheat. I did not get a very good catch of clover, and I plowed it down and sowed it to wheat again, and got a remarkable catch of clover. I plowed that down last spring and sowed it to buckwheat, and this year I planted it to strawberries, and we did not have any trouble with weeds this summer, not even chick-weed. I sent a man to clean the patch and he went over it in less than three hours. I think by following that method I can run strawberries on the same patch for three or four years.

Q.—Did you ever grow strawberries in hills?

A.—No.

A MEMBER: I have tried them in hills at Clarkson and it is not a success. I also grew them in other parts, but did not get the yield that I get at Clarkson.

MR. HAMILTON: Our system is practically the same as yours. The cost of growing has increased. We are now paying two cents per box for picking where we formerly only paid one cent. We never had such a profitable season in strawberry growing as we have had in the last two years. The price right at the farm was 20c. a box, and for some of our raspberries we got 30c.

MR. RITTENHOUSE: I am not satisfied as to the width of the matted row.

A.—I have three acres side by side, one acre and a half planted three feet six inches and the other four feet, and I like the four feet best. I want eighteen inches or better between.

MR. KYDD: What do you do to prevent the runners filling up that row?

A.—I am thinking strongly of getting an instrument made for the purpose. I can have one made that I can use two horses on it. I always remove the mulch in the spring, some leave it on the row.

MR. RITTENHOUSE: How do you get over the difficulty with the pickers wanting to pick both sides of the row?

A.—The last three years I have had my pickers take half of each row. I know that there are things that might be said for or against each method. I usually get rid of one or two when they start finding fault too much, and that settles it for the season.

MR. HAMILTON: With us the pickers pick on each side.

MR. RITTENHOUSE: The most satisfactory way that I have found is to get the pickers to pair off and take a row between them.

A.—That was the very thing I was trying to avoid.

MR. RITTENHOUSE: I never had better success than when I had a Polish gang, and I paid one man \$3 per day to look after them.

A.—You get on with the Poles better than most people do.

SMALL HOLDINGS FOR PROFIT.

F. C. KEELER, BROCKVILLE.

I shall endeavor to speak to you concerning my experience along the lines of fruit and vegetable growing on a ten acre farm situated three miles east of Brockville on the bank of the River St. Lawrence.

I purchased this small farm in 1905, for the price of \$1,300, which was at that time a cow pasture with a poor fence around it. First of all I erected a house and barn, and when I paid for the same I had the large amount of 40c. left.

I commenced work tilling my land and hauling manure, and started a fine vegetable garden. I had good luck, and cleaned up a nice little profit at the end of the season. In 1906 I purchased some very fine McIntosh apple trees, raspberry and strawberry plants, currants and gooseberries, and asparagus roots, and rhubarb, etc.

I planted these and cared for them along with my vegetables, thirty varieties in all. The best encouragement I received from my neighbor was that I would starve to death on ten acres. Well, I will admit I did my best to beat the game, We did not favor an eight hour day then. It was rather like a fifteen hour day, trying at the same time to show my people what could be accomplished on a small holding with a small investment. I have not starved to death on the small farm. Rather than that I have been able to come in possession of enough money

to purchase a timber limit in the County of Addington, valued at \$10,000, and also two other fruit farms, fifteen acres each, and I also am the owner of a \$10,000 Victory Bond. I had the pleasure of being offered \$10,000 for the first fruit farm which I paid the large sum of \$1,300 for fourteen years ago, which encouraged me very much. I retail my fruit and vegetables direct to the consumer, receiving highest prices for same. It has been said we have the highest priced market in Ontario.

I purchased a motor boat large enough to carry one ton, and began to supply the wealthy river people on the islands on the St. Lawrence River. I also supplied the Cornwall Navigation Co. steamers.

Some of my crops do not pay me as well as others. Catering to a public trade I am asked for many articles that otherwise I would not grow.

I grow thirty varieties of fruit and vegetables, commencing on May 20th to cut my asparagus, one acre in all, which is worth about \$500. Next strawberries, commencing June 20th, on three-quarters of an acre. I picked in 1918, 8,000 baskets, receiving \$1,200 for same.

At the same time, we were picking radishes, lettuce, rhubarb, peas, early potatoes, beans, for which we receive a fancy price.

I next harvest my raspberries, currants and gooseberries, for which I could not give you exact figures on returns, neither in cash or acres, as I grow same in my orchard rows.

Commencing first in August on tomatoes, celery, melons, sweet corn, onions, cabbage and cauliflower. I load two wagons each day for market. I carry this along until about the end of October. I commence picking my McIntosh Red apples about the 15th October, and continue picking till we have finished all, including Russet and Greening. I had a fine crop of McIntosh, for which I received \$10 per barrel, shipped to Chicago.

I also specialize in Irish Cobbler potatoes for seed, for which I received \$3 per bushel. Also Golden Bantam sweet corn, Wardwell's kidney wax beans, and Gradus peas. I grow my seed and can rely on same.

I also have 100,000 strawberry plants for sale, namely: William Belt. Commencing to cultivate same in 1912, I then picked only 4,000 quarts per acre; but with careful plant selection and first-class cultivation I have increased the yield to 8,000 boxes per acre. The first three years I sold plants for \$5 per thousand; to-day I get \$10 per thousand. I have my plants growing as far west as Manitoulin Islands, and as far east as St. John, New Brunswick.

I am cultivating the Herbert raspberry, for which I cannot supply the demand, either in plants or fruit, and will say, now is the time for returned soldiers to get busy. I can safely say I do not know of a better investment for a man with a small capital to start right now on a small farm and plant fruit, and more fruit. It will double the value of the land, and you won't be tied to the cow's tail the year round, trying to get back the price of her feed in milk, on a large farm with a large investment and the long hours, which is the reason the boys won't stay on the farm.

I have had good luck with my help. I employ three men and ten berry pickers. I pay regular wages, and also give a prize for the best picked berries, which I will say is a good investment. I have a bungalow for the pickers to live in, on the bank of the river. I furnish them with a boat, fruit and vegetables, and have had more and better results in this way. I think prices will be high for a long time, which is better for everybody, it puts more money in circulation.

Mr. A. C. Miller, Member of the Federal Reserve Board, says that high prices will prevail until the expansion of currency and credit, resulting from the buying of war securities on credit, has been eliminated, and until the volume of credit and currency has been reduced to an equality with the needs of industry and trade.

Barnyard manure is what I use, and potash and nitrate of soda when I can get it. Prune well; cultivate well; spray well; pack your fruit well. It will pay you to cast out all inferior culls, and it will increase trade.

Q.—What variety of raspberries do you grow?

A.—The Herbert, I think there is no raspberry like the Herbert for my business.

Q.—Do you pay your pickers by the day or by the box?

A.—By the box, and I built a nice bungalow at the river bank for the pickers to live in. They do their own work and cooking, and we do not have any bother.

Q.—What do you pay for picking a box of strawberries?

A.—If we have a heavy pick it comes down to a cent and a half, and it goes up according to the pick. I am paying this year, 2c. per box.

Q.—How much do you pay for picking raspberries?

A.—From 2 to 3c. and on up to 5c. A lot of my customers came in this year and said they would pick their own raspberries if I would allow them 3c. per box for picking them, and I was glad to do it.

Q.—Do you find that pays?

A.—If I had 100 acres of raspberries I would have it all done in that way. I think that is the thing we will have to do if we go into the raspberry business. I have had the pleasure of receiving \$10 per barrel for my McIntosh apples this year, just as they come from the trees. I think I am safe in saying it is the only apple grown in our county that will pay a profit. I grow a large quantity of the Irish Cobbler potato, and sell them for seed. I always have a good supply of strawberry plants for sale. I am growing celery to-day that costs me less than one cent per head. I took the first prize for it at our exhibition. There is a man growing celery in a muck pond down our way, and he grows a large head of celery, but it is very bitter. I am told that last year his expenses were more than his income. He saw my plan and admitted that I had him beat. It takes a large quantity of fertilizer to grow it my way, but I can grow as much on one acre as I usually did on ten.

Q.—How large are your beds?

A.—Twelve feet square, I would not recommend that size to a beginner, I would prefer six by twelve.

Q.—What distance between?

A.—Just walking distance.

Q.—How do you plant?

A.—The celery is grown so close together that the centre heads bleach themselves, and next year I am going to grow corn very thick around the beds. There is difficulty in handling celery grown in that way. We have difficulty in carrying it to market without breaking it.

Q.—Do you use water?

A.—Yes, I use more water on the celery than I do on anything else. We have only a small area of celery planted as yet, and we have lots of help, and we put the water on with pails.

Q.—Why does not the asparagus pay you as well?

A.—It cost too much to keep the beds clean.

MR. ROBERTSON: I have an asparagus bed that I have been running for twenty years, and I got four tons off it last year.

MR. KEELER: The reason I grow asparagus is that it is the only thing that I can have to come in just before the berries. I have tried two varieties of black raspberries and they won't grow in our climate.

MR. FLEMING: Will the canning factories take the Herbert raspberries from you?

A.—The canning factory does not get any of our fruit. We have not begun to think of the canning factory business. We sell our stuff to the campers on the Thousand Islands.

Q.—What do you get for the celery?

A.—Three bunches for 25c., I believe in high prices. It is better for the laboring man and everybody else. The working man is getting more luxuries now than he ever had before. It is better for us to be able to pay the laboring man \$4 per day than \$1 per day. I can remember when I got laboring men for 50c. per day, and I had the pleasure of selling strawberries for eight boxes for a quarter.

Q.—Did I understand you to say that you took four or five barrels of apples off a McIntosh apple tree ten years after planting?

A.—Yes. I bought them when they were three years of age, and I planted them in this garden soil, and they grew very rapidly. I planted them thirty feet apart and forty-eight trees to the acre. I live where I can get stable manure for fifty cents per load, and I can get all I want.

GOOD NEW NOT WELL-KNOWN VARIETIES OF SMALL FRUITS.

M. B. DAVIS, C.E.F., OTTAWA.

I purpose to lay before you a brief description of a few varieties of small fruits that are worthy of your consideration.

All the varieties here recommended have been tested for some years on the trial grounds at the Central Experimental Farm, Ottawa, and it is thought that having shown a good record of performance, as compared with some of our standard varieties, it is time the attention of the trade was called to their merits, so that individual growers might test them on a larger scale, under their own conditions.

For the information of those not acquainted with our soil conditions, I may say that the soil at the Horticultural Division in Ottawa is a very light sandy loam.

STRAWBERRIES.

Portia. I wish to call your attention to a variety named *Portia*, which is a variety of C.E.F. origin. This berry is a seedling of William Belt, and is promising from many standpoints. In habit, it is very vigorous with abundant large and dark green foliage. Practically resistant to rust, it is an excellent plant maker, and is a variety that can be planted the maximum distance apart with the assurance that it will readily form a good matted row. For anyone growing berries on the hill system it is to be especially recommended, as it forms an excellent crown. The flower is practically imperfect, producing a berry medium in size and slightly

larger than Parson's Beauty. In color, it is a rich deep crimson, which is carried right through to the core, with seeds which are very prominent. With its regular conic shape, attractive color and prominent seeds it is difficult to imagine a more handsome product, as it is exceptionally firm and solid it should be an excellent shipper, especially if picked before it becomes over ripe. In quality it is good, possessing a mildly acid to sweet flavor. As a canning berry it stands in a class by itself, being the only berry among the best known standard sorts to hold its color and surpassing all in quality and appearance.

In season it is about the same as Parson's Beauty, but gives a larger yield at the end of the season, and a few more pickings. Planted with Parson's it would be a distinct acquisition to any patch, and where growers are supplying a special trade this is a variety of such distinctiveness, that it could be used as a good drawing card when sold as the canning berry which holds its deep rich color.

A few plants of this variety will be available at the C.E.F. next spring.

RASPBERRIES.

In raspberries, I wish to call your attention to three varieties, Newman No. 23, Count, and Brighton.

Newman No. 23 is a seedling of unknown parentage, but according to Mr. C. P. Newman of Lachine Locks, Que., who originated this variety, it is most likely a seedling of Eaton with King as a male parent. This variety is outstanding at Ottawa and has impressed us most favorably. It is pre-eminently a shipping berry. As it has done excellently on Mr. Newman's soil, which is much heavier than ours, it apparently has wide range of adaptability. The bush is a vigorous stocky grower of about four to four and a half feet high, with rather an open centre, but strong canes with numerous branches.

The fruit is large, slightly larger than Herbert, bright crimson in color and very firm. In quality it is practically as good as Herbert. In productiveness it ranks close to Herbert with us, and apparently is as good on a heavier soil.

As a canning berry it is difficult to surpass, holding its shape excellently.

Two shipping tests were made of this and a number of commercial varieties, including Herbert and Cuthbert. Upon the return of the crates, Newman 23 easily won first place. The fruit had not settled or mused, and when the boxes were emptied the berries in the bottom were still firm and shapely, whereas, in the case of Herbert the fruit had fallen a half inch and the bottom layer was nothing but juice, while Cuthbert, recognized as a good shipper, showed considerable mussiness in the bottom.

For a grower who intends to sell to the cannery or who ships long distances, this variety is a distinct acquisition.

In season, it commences to ripen with Herbert, but has a much more extended season.

Plants of this variety will, I understand, be available next fall from Mr. C. P. Newman, La Salle, Que.

Count. A very early raspberry originated by the late Dr. William Saunders, is worthy of a place in your plantation where an early berry, which has good appearance, is a good yielder, a good shipper, and a good canner is desired.

The bush is a very vigorous upright grower, about four feet in height and hardy. Berry, bright red in color, about the size of Herbert, medium quality and firm. Very early and productive. A seedling of Bigger's Seedling.

Brighton, which is almost as early in season, slightly better in quality, not quite as heavy a yielder, not as good a shipper, is also worthy of extended trial.

These two varieties are outstanding early sorts, and mark distinct progress in the development of a very early berry, which is good in quality, firm and productive. Plants of these varieties will be available in limited quantity next fall from the C.E.F.

GRAPES.

Three varieties of grapes are on our test as worthy of introduction to the trade.

Lincoln. The first is a blue grape called Read's Hybrid, originated by M. H. Read, of Port Dalhousie, and named Lincoln after Lincoln County. This grape is said to be a seedling of Concord with Black Hamburg, and has been at the Central Experimental Farm trial grounds since 1897. Its record of performance, compared with Concord, is quite noteworthy. In productiveness it has given about 20 per cent. better yields than Concord. The vine is a vigorous grower, free of mildew and quite hardy, a factor, of course, not so vital in the fruit districts. The berry is somewhat smaller than Concord, being about the size of Brighton, the bunch is about as long as Concord, more oblong in shape and much more compact, making a very regular and handsome bunch for market purpose. In quality it is somewhat better than Concord, having inherited some trace of quality from its *Vinifera* parent. As a shipper we have no evidence except apparent characteristics, which lead us to believe that it should be a better shipper than Concord. It has a thicker and tougher skin, according to the mouth and teeth test, and this is borne out by accurate measurements and examinations under a high-power microscope. According to a large number of sections of the skins of these two varieties, which were made and examined; Concord has an average thickness of 39.74 micromes, while Lincoln has an average skin of 57.54 micromes in thickness. In other words, Lincoln has a skin which is 45 per cent. thicker than the skin of Concord.

In addition, the same examination showed that the cells of the Lincoln skin were smaller, thicker and more closely packed, this giving accurate evidence to corroborate our preliminary test as to thickness and toughness of skin.

These findings lead us to conclude that this should be an excellent shipper. In season, it is about with Moore's Early.

This variety is certainly worthy of a very extended trial and it is to be hoped that Mr. Read can be persuaded to introduce it to the trade immediately.

Mary. This is a variety of red grape which is worthy of mention. A seedling of Catawba, introduced by a Mr. Hasselkus, of Griffin, Georgia, in 1885. It resembles Lindley very closely, but is more vigorous and more productive. It is somewhat earlier than Lindley and fully as good in quality, makes a more compact bunch and should be as good or even a better shipper, and as good a keeper. A few vines of this variety will be available next fall at the Central Experimental Farm.

Seedling Grape from Wilkins. This grape was first brought to your attention in 1898, when it was mentioned by the Committee on seedlings and new fruits, when it was said to be worthy of trial. This is a seedling grape from O. F. Wilkins, Bridgeburg, Ont.

It is a white grape of medium size, of better flavor than Niagara or Concord. The bunch is of good size and form, and quite compact. Season somewhat earlier

than Niagara, skin about the same thickness. This variety could well be used for the home market to extend the season of Niagara. In productiveness it has proved fully equal to Niagara, at Ottawa.

CURRENTS.

The attention of growers has already been called to the Saunders Hybrid black currants, which have given such excellent results at Ottawa and elsewhere, when given a trial.

The best of these varieties are exceedingly productive, hardy, of good quality, and ripen their crop fairly evenly.

Saunders, which is already on the market, is one of the best, while Kerry, which is a newer variety, is probably the pick of the whole lot. Cuttings of Kerry have been supplied to nurserymen and will probably be on the market next fall.

Q.—Have you any raspberries later than Cuthbert?

A.—Yes, we have one of Dr. Saunders'. It is not much more than a week later than Cuthbert. It will give you a larger crop at the end of the season than Cuthbert. The Thara gives a large quantity of fruit. We have never been able to grow blackberries sufficiently hardy to withstand our climate at Ottawa. The St. Regis is the earliest berry we have, and it is not a heavy yielder.

ELECTION OF DIRECTORS.

MR. FLEMING: I am not a director of this association, but the point has been brought up that the directors are selected by districts, and they might be selected according to the membership in the district. For instance, Norfolk district has over two hundred members and the district of Forest has only six members, and the representation on the Board is the same in both districts. I am told that the directors do not receive any remuneration, and that they give their services free, I do not think that is right.

A MEMBER: Norfolk has about one-third of the total membership, and that would mean that they would have one-third of the directors.

MR. DEMPSEY: The constitution will not admit of any change without notice is first given of the proposed amendment.

MR. ROBERTSON: Was not there some change in the districts a year ago?

MR. HODGETTS: Yes. The Eastern Counties at that time were giving us very few members and two of the districts were amalgamated, and Wentworth and Lincoln were separated. Mr. Fleming thinks that we ought to go further, and that the districts that are not interested in fruit growing should not be represented as fully as they are at the present time. I understand that the vegetable growers have some such scheme.

THE CHAIRMAN: When this change in the constitution was brought about it was with the view of trying to encourage fruit growing in different parts of the province, and to interest a wider section of the people. I can remember very well when the Ontario Fruit Growers' Association was practically a Grimsby Fruit Growers' Association. After a while the area in which productive fruit growing was carried on was increased, and it was thought desirable by the officers of the association to try to encourage that.

FERTILIZERS FOR THE FRUIT GROWER.

HENRY G. BELL, DIRECTOR OF THE SOIL AND CROP IMPROVEMENT
BUREAU OF THE CANADIAN FERTILIZER ASSOCIATION.

The future of Canada's fruit market depends on how fully Canadian horticulturists adopt methods that most quickly and permanently increase yields, and improve quality. Increase in demand does not always follow increase in production, but in this case I am confident it would, in that better quality of product would of itself constitute an important advertising medium. Moreover, better business methods which contemplate a more careful standardization of the product being placed upon the market, induce more sales-getting advances into old markets and invigorate advances into new territory.

The apple industry of Canada in 1910 amounted to approximately 101½ million bushels of fruit. Of this, Ontario produced considerably over half. Mr. Macoun, Dominion Horticulturist, is sponsor for the statement that apples can be successfully grown in the provinces of Ontario and Quebec over an area of about 700 miles in length, varying in width from 30 to 50 miles.

Opportunity for the successful production of fruit in the province is dependent upon at least six great factors:

1. The soil.
2. Climate.
3. Variety of choice.
4. Tillage practices.
5. Disease and insect control.
6. Plantfood supply and management.

No doubt other factors could be added, and some already mentioned could be sub-divided, but these are the main points which interest the average grower of fruit of all sorts. I shall attempt to discuss but one of these factors, since practical horticulturists are informed pretty fully on most of the others. The point to which I shall address my attention is the last—orchard plantfood and its management. This topic of itself is one of enormous importance and great breadth. In fact, it might involve the specific study of soil types, methods of tillage, sources of plantfood, etc. However, of these sub-divisions I shall again make a choice, not in any way insinuating that I consider the other factors of lesser importance, but to conserve the time at our disposal.

Plantfood for the orchard then, may come from the soil, green manures, leaves, stock manure, and from fertilizers. Mr. Macoun has on former occasions pointed out the necessity of plantfood in the orchard. He has shown that 160 barrels of average apples take from the soil approximately 8.9 lbs. of nitrogen, 5.2 lbs. phosphoric acid, and 32.8 lbs. potash. This being the case if the orchardist continues to take off crop after crop without putting back any plantfood, it is but a mathematical problem to figure how long the bank account of soil fertility will stand the draft.

This may sound to be a theoretic treatment of the subject. Let me point to an exact case in point. Before the oldest member of this audience was born, thousands of acres in southern Ohio, along the Ohio Valley, were producing profitable crops of apples. In fact, it was in this territory that orcharding in the central part of North America had its beginning. Twenty-five years ago the same territory exhibited equal, if not greater areas of orchard, most of which

were old trees, but these were orchards that were not returning a reasonable interest on the money invested in the industry. In fact, the annual history ran about as follows: Springtime blossoming gave great promise and provided the shrewd orchardist with ample opportunity to unload his unprofitable enterprise on the back of some unsuspecting tenderfoot, who admired the location, the general beauty of the landscape and the promise of the orchards. Shortly after the blossoms dropped, the early setting of fruit began to show unsatisfactory development. This discouraging state of affairs increased as time went on, until that section of the Middle West became famous for its non-productive orcharding. The Ohio Experiment Station was appealed to. The orchard specialists of that institution claimed that the trouble was the uncared for condition of the orchards. To demonstrate their claim they engaged areas of orchards where proper pruning, spraying and tillage were immediately put into practice, but the results were still far from satisfactory. This led the Soils Division of the Experiment Station to investigate the plantfood content of the orchard soils, with the result that the trouble was traced to a lack of plantfood. Ohio orchardists have learned how to supply proper plantfood, with the results that the orcharding of this section has come back to be one of the foremost industries. Of the methods we shall speak later. The point I wish to make is that orchard practice which indefinitely neglects supplying plantfood is as sure of disaster as we are sure that the sun will rise to-morrow.

I have been asked to speak on the subject of fertilizers for the fruit grower's use. "Why use fertilizers?" The answer is obvious. Orchard soils are running short of necessary plantfood, livestock manure is becoming scarcer and scarcer; in fact, in view of our ordinary mixed farming practices, there is not one-hundredth enough to go round. With the growing of legumes as cover crops, one important constituent of plant food—nitrogen—is being returned. To answer the question specifically, "Why use fertilizers?" let me point out what fertilizers have done in actual tests. First, in our own province, the ten year report of the Vineland Station shows increases in three yields from 6 per cent. to 75 per cent., as a result of proper fertilization of a peach orchard which was set apart for tests. Pennsylvania Station has been conducting extensive orchard investigation in various parts of that important orcharding State. In Bulletin 153, published by Prof. Stewart, he records the fact that by the addition of fertilizers, yields have been increased 265 and 308 bushels per acre over normal, without fertilizers. He reports that the gains have been made at fertilizer costs of about 13c. to 27c. per bushel, even at present rates and prices. In fact, on one plot, No. 2, the increase was made at a cost of 9c. per bushel.

The investigations regarding orchard fertilization conducted by the Ohio Experiment Station, which are probably among the most thorough-going to be found on the continent, record that the increases attained in apple production alone, from 1910 to 1915 were worth over a quarter of a million dollars. Where 12½ lbs. of fertilizers were applied, per tree, on an orchard of Ben Davis apples, the yield was increased from 20 barrels to 49 barrels per acre. The following year the same orchard yielded, unfertilized, 9 barrels; fertilized, 46 barrels per acre.

Maine Experiment Station has conducted orchard fertilization tests at Highmoor Farm since 1914 with the following results:

Orchard Fertilizer Experiment. About 130 Ben Davis apple trees in each plot. Average yield of apples in pounds per tree.

Year	Plot 6 A No fertilizer since 1912	Plot 6 B 7.2 lbs. 5-8-7 fertilizer per tree	Plot 6 C 14.4 lbs. 5-8-7 fertilizer per tree
1914	172.8	158.8	194.2
1915	121.1	131.8	157.4
1916	113.7	138.7	147.2
Average for 3 years	135.7	143.1	166.6

New Hampshire Experiment Station, which has been conducting a fertility test for some time past, has not recorded any great gains in yield. It has found, however, that the size of fruit has been increased by the use of fertilizers and the proportion of No. 1 apples, also the total area and weight of leaves has been greatly increased.

I could go on, but these instances should prove sufficient to answer the question, "Why Use Fertilizers?"

The comparative newness of this part of the continent has, up till recently, made it almost unnecessary for you to bother about the plantfood of the soil. From the time of the red man until periods quite within your own memory, all that was necessary was to stir the soil, plant the crop or set the tree and reap the crop. It is true that within the last couple of decades a great deal of attention has been given to such points as the best rotation of crops, best cover crops, how deep and how frequently to till the soil, etc., pertaining to the mechanical management of the soil. These are of enormous importance and are absolutely essential to the proper use of fertilizers because fertilizers are carriers of plantfood. Your crops—whether apple trees, grape vines, celery, cabbage, or what not—cannot take up a bit of plantfood, other than carbon dioxide, unless the plantfood is first dissolved in the water of the soil or in the root juices of the plant. Hence, the absolute necessity of an abundant supply of water. Your own practices of plantfood management have been comprised very largely of the growing of legumes and the use of stock manure. Both of these practices are good, but together they fall short of the possible best, first, because the supply of manure is becoming scarcer and scarcer, and its quality poorer; and second, because there is a demand for a great deal more plantfood than can be supplied in the nitrogen from legumes or from any other source than fertilizers.

Now, from my investigations, where I have had opportunity to examine orchard practice in various parts of the province, I am convinced that one of the things that is holding back your net returns from orcharding in Ontario is a lack of specific information regarding fertilizers. I am therefore going to ask your careful attention for the next few minutes while I discuss what fertilizers are and how they should be used.

The use of fertilizers antedates extensive fruit growing in Ontario. Fertilizers came as a product of the years following the French Revolution. Starvation aroused men to seek new methods of crop production. Leibig, the German chemist, developed methods to treat bones in order to render them soluble. These methods

involved the addition of sulphuric acid to bone, and later to phosphate rock, which is a carrier of the same plantfood constituent. The acid reacted on the rock, breaking it down into a new substance, which substance—acid phosphate—is to varying degrees soluble in water. This important constituent of plantfood causes the ripening of the crop. This was a great discovery, because in the systems of European agriculture an addition of bonemeal, treated as described, and later of phosphate rock, also treated, which forms acid phosphate, was found to greatly hasten the ripening of grain and other fruit crops and to invigorate their root growth. But students of plant growth soon came to see that by adding bone or acid phosphate only one of the important constituents which were falling short in the soil were being supplied. Hence, the use of materials carrying nitrogen and potash.

Now let us get a perfectly clear view of the leading functions of these important plantfood constituents because it is they that we meet at every turn in fertilizers. Phosphoric acid or phosphorus hastens the ripening of tree fruits and grains. Nitrogen is the constituent that increases wood and leaf growth and retards the ripening of the fruit. It may be that by manuring and growth of leguminous cover crops you have so enriched your soil in this constituent that your trees have too great a twig growth and too much leafage, thereby cutting down the fruit yield and impairing its quality. You must balance up the ration with phosphoric acid and potash. Potash seems to have an important bearing on the health of the crop, in that it increases disease resistance.

Now comes the question, where do the carriers of these three important plantfood constituents in fertilizers come from?

Phosphoric Acid. We have already pointed out that the phosphoric acid came from bonemeal, which also contains a small amount of nitrogen, and from acid phosphate. Another, and slower carrier of phosphoric acid, sometimes used in the orchard, is basic slag. This material is a by-product of the steel industry, containing a low and relatively slowly available form of phosphoric acid and about 30 to 45 per cent. of lime.

Nitrogen. The nitrogen or ammonia of the fertilizer may come from several sources. First in order of availability is nitrate of soda, which is a very soluble salt, obtained from Chile, South America. This nitrogen carrier gives quick action. Nitrate of soda used on a sandy soil may be so quickly soluble that part of it may leach away. Sulphate of ammonia, the by-product of the coking industry, is another important carrier of nitrogen. It is more slowly soluble than is nitrate of soda. A new product which is finding its way more and more into the fertilizer market is cyanamid, a material composed of the calcium of lime, carbon of the air and nitrogen of the air. These are combined electrically, producing a dark grayish dust or powder, which carries a considerable amount of fairly rapidly available ammonia. To these three sources of nitrogen may be added blood and tankage, which are the by-products of packing plants: tankage carries some phosphoric acid also, in as much as it contains bone.

There is a point worth emphasizing at this stage, and that is the importance of relative availability. For a rapidly available fertilizer—if your orchard should be in need of that—nitrogen, coming largely from nitrate of soda or sulphate of ammonia, should be used. For an orchard fertilizer to last through the growing season a large per cent. of the nitrogen should come from organic sources such as blood and tankage.

Many eastern orchardists make extensive use of the same analysis of fertilizers

as they use on their potato crop. These fertilizers usually contain about one-third rapidly available nitrogen and the remaining two-thirds in a form that will last throughout the growing season.

Potash. The carriers of potash, which previous to the war were most largely used were sulphate and chloride or muriate of potash. In the cruder or less pure form these potash salts were called Kainite, which contains about 12 to 14 per cent. potash, as compared to 48 or 50 per cent. in sulphate and muriate. During the scarcity of this important plantfood the fertilizer industry on this continent developed several American sources, which include wood ashes, potash from cement plants, the liquor from sugar beet factories, and the evaporated waters of salty lakes of California, Nebraska and other sections. The potash supplied in this latter form frequently contained considerable carbonate of potash as well as sulphate and chloride. This carbonate form is equally good as plantfood.

Now the fertilizer industry obtains its raw materials from all of these sources. It assembles the materials six months ahead of the time that you are ready to use them. Now I want to tell you something about the care with which fertilizers are made, not to advertise the industry, but to disabuse the minds of some, perhaps, who may still have a feeling that the fertilizer industry is simply that line of business that collects all that is useless to every line of industry and palms it off on the farmer as something mysterious which is good for his farm. On the contrary, the fertilizer industry possibly stands on a better basis than most other industries when viewed from the standpoint of the scientific care with which its products are manufactured. Chemistry is of course the basis of the industry. Every raw material which is assembled is carefully analyzed. In making up what is known as a brand or guaranteed analysis the various ingredients are combined or mixed precisely on the basis of their chemical analysis. Not only is this the case, but frequently samples of the product in process of completion are tested for analysis. When the mixing is completed the product stands for 30 to 90 days when it is again sampled, reground and resifted, before being put on the market.

In the foregoing brief statement I have tried to cover some of the most important points in the making of fertilizers. When you come upon the product on the market or when the salesman or agent calls at your farm he talks about brands, and he mentions such figures as "3-8-3" or a "4-10" or some other analysis. Now the first figure always refers to nitrogen or ammonia, the plant grower. The second figure always refers to phosphoric acid, the plant ripener. While the third figure refers to potash. The various figures represent percentages of a ton, that is, a 3-8-3 means that there is 3 per cent of a ton or 60 lbs. of nitrogen contained in this fertilizer; the 8 means that there is 8 per cent. of a ton or 160 lbs. of phosphoric acid in the fertilizer, and the 3 per cent. of potash means that there are 60 lbs. of potash in this particular brand. One more point: Remember that each of the brands are registered with the Dominion Analyst, and that the fertilizer manufacturer is liable to a severe penalty if the product offered on the market under tag is found to fall below the guaranteed analysis recorded on the tag. I mention these points to disabuse your minds of any idea of mystery or subterfuge which formerly you may have attached to the fertilizer industry.

I have failed as yet to touch upon the point which comes nearest to your business. You want some light on the question what analysis and how much fertilizer should a man use on his orchard in order to get best paying results? Without elaborating on this subject I wish to make three statements which I

could substantiate with abundant proof if time permitted. First, you cannot get at the best analysis of fertilizer to use on your soils by soil analysis. Second, no one, from a sample of soil, can advise you exactly how much or what analysis of fertilizer to use on your soils in order to get best results under your conditions. Third, actual experience on your own farm, under your own conditions, is by far the best indicator as to most profitable future practice. I can tell you what was used in various experiments and actual farm tests. On the basis of what information I have accumulated concerning soil types and crop requirements, along with observation of extensive practice I can tell you what I think will give best results under your conditions, but having done this the exact working out of your problem is left with yourself and so it must always be. For instance, in the Ohio experiments, where they got such remarkable results by fertilizing the orchards, they increased the yield from 20 barrels per acre to 49, and from 9 to 46, by using to the tree 12½ lbs. of plantfood composed of 5 lbs. of nitrate of soda, 5 lbs. of acid phosphate and 2½ lbs. muriate of potash. This they scattered in a circle around the tree, out about the extent that the branches of the tree covered the ground. In various of the experiments I have studied, the investigators found that the best time to apply fertilizers to the orchard was just when the fruit buds are forming or just at the time they were opening. In some of the Ohio experiments they did not find a pronounced profit from the use of potash. A few rather interesting records are on file regarding actual financial returns where different fertilizers supplying nitrogen and phosphoric acid were used. They are as follows:

Comparative results in Ohio Tests.

	Amount used per tree		Total gain	Gain per tree
	Nitrate of Soda	Acid Phosphate		
1.	2½ lbs.	5 lbs.	\$103.	\$2.45
2.	5 "	5 "	171.	4.07
3.	10 "	10 "	174.	4.14
4.	10 " tankage	10 " bonemeal	6.65	1.58

In some sections of Europe it is considered good practice to supply a large amount of phosphoric acid in the form of basic slag. Pennsylvania Station has tested this source of phosphoric acid in comparison with acid phosphate for the orchard and finds that acid phosphate leads basic slag by 54 bushels to the acre as an average of their tests.

Finally, it seems to me that the most profitable fertilizing practice for your orchard can be determined to quite an extent by a study of the trees themselves. If the leafage is sparse and the twig growth is indifferent, there is clear indication of the lack of nitrogen. If, on the other hand, twig growth is extensive and a great deal of leafage and a slow ripening of the crop, there is pretty clear indication of the lack of phosphoric acid. Undersized apples, insipid in taste, and fruit trees susceptible to disease indicate a marked lack of potash. As a general rule you will find sandy or gravelly soil short of all three of the plantfood constituents, and orchards on such soils will naturally require more abundant feeding than were they found on richer loam soils. Clay soils are fairly well supplied with all three plantfood constituents, but the phosphoric acid and potash of clays may be in forms in which the tree cannot readily use it. It may pay,

therefore, to make material additions of well-balanced fertilizers to orchards on soils of this type. In actual farm practice, as the result of the investigation, Pennsylvania Station recommends the use of 500 lbs. per acre of a fertilizer analyzing 6 per cent. ammonia, 8 per cent. phosphoric acid and 5 per cent. potash. Remember Pennsylvania Station makes the report that it finds that on orchards located on the best soils fertilizers can be used at greatest profit.

In these remarks I have tried to give you a survey of the fertilizer industry in its relation to your own. I have pointed out the actual carriers in fertilizers of the same plantfood exactly as you are supplying in stock manure. I am not recommending any brand, make, or analysis of fertilizer, because a scientific investigation of the problem forms no basis for such a recommendation, but there are points that I wish to lay special emphasis upon. The first point is that orchard fertilization is eminently profitable. I am aware that there are experiments on record which would not substantiate this statement. I am aware also that there is abundant orchard practice on record as well as a considerable fund of experimental data that abundantly supports my statement. I do not attempt to say that the same analysis and quantity of fertilizer used on your orchard would give the same results as those used on your fellow fruit grower's farm in some other section of the province. Some of you are dairymen to a small degree. You know the importance of feeding your cows abundantly a well-balanced ration. Feeding your fruit trees is precisely the same problem. The second point I wish to make is that not only does quantity depend up on proper fertilization of the orchard, but quality is also involved, and the third and last point is that fertilization is one of the big factors—but only one—involved in the improvement of the orcharding industry of Ontario or Canada. Fertilizers will not take the place of drainage, nor will they do the job of spraying or pruning or proper soil tillage, nor will fertilizers take poor varieties and produce good results from them. But scientific investigation and actual practice show that the liberal use of suitable fertilizers in connection with other proper management rarely fails to give abundant and profitable results.

FRUIT AND VEGETABLE COMBINATION ON SMALL ACREAGES.

E. J. ATKIN, LEAMINGTON.

Few native Canadians have any conception of the possibilities of an acre of soil. The principle of expansion is as old as the law of self-defence. Individuals as well as nations have grasped for more for all time. In our greed for gain we ignore the small and seemingly insignificant things in nature, and rush wildly on without chart or compass. Unless our system of Agriculture is radically changed within the next fifty years, coming generations will have a food situation to solve, that is now perplexing India.

This fair Ontario of ours, which ranks highest of all Provinces in the Dominion, for the production of food-stuffs, is being dispoiled to satisfy this lust for expansion.

With our forests gone, and our marshes and low-lands drained, so that the water that should remain for months in land is rushed in a few weeks to the sea, we have nothing to expect but blights and diseases for our orchards and crops; and drought, hot winds and hard winters for our farms.

The past few years, owing to the great war and the extreme scarcity of farm labor, has taught our farmers more in regard to intensive Agriculture, smaller acreage, and larger yields than the whole previous century. The successful farmer of to-day will no longer spread a five-acre crop over a twenty-acre field, as the net income will not warrant the expense. The farmers of to-day, and more particularly the fruit and vegetable growers, have learned several valuable lessons within the past few years. The first and foremost of these perhaps is, that intensive farming and rich soil is the only line of Horticulture that pays. Secondly that crop rotation must be followed to produce successfully, year after year, a large, healthy and profitable crop.

As to the first point, it is not my intention to mention it but briefly. In the Leamington section, where the scarcity and high cost of manure makes it almost prohibitive, we must resort to other means. True, we do use a small amount of farm-yard manure, particularly where we have to follow extremely intensive forms of culture, as in the greenhouses and on our irrigation plots. In the latter we give an annual application of about twenty tons per acre, which is supplemented with commercial fertilizers. Where possible a cover crop is also sown in the fall which is plowed down in the spring. On the remainder of the land a fall cover crop is generally grown, this is plowed down in the spring and supplemented with commercial fertilizers.

Crop rotation is the one that requires, perhaps, the greater consideration, and the proper rotation, to a great extent, controls the loss from insect pests and plant diseases. While the majority of those before me, I presume, are fruit growers, a large number engage in vegetable growing as well. These two work well together in a good many localities and on proper soil, especially one that is sandy in nature; they give us a combination that is both profitable and easily handled. While vegetable growing is the principle one in our district, a large number of the growers have found that a combination of the two work well together, especially the smaller fruits, such as strawberries, currants and even peaches, to a very great extent. As a sandy soil is not so well adapted to cherries, plums and pears, these are very little grown and are not nearly as profitable as the aforementioned. The peach trees are planted out early in the spring on a soil that has been previously well prepared. Early tomatoes are then planted in the orchard; the cultivation necessary for them gives the trees a good start at no extra expense. In the fall, the vines are pulled up and piled around the roots. These give protection and also serve as a catch to the snow. The second year the orchard is planted with melons. These grow well and the only preparation necessary is digging some well rotted manure in the hills. The third year often no crop is planted if the trees have made a normal growth, but if the space is limited and the trees permit it, two rows of tomatoes are often planted the wide way, the third year. By the fourth year the trees will commence to bear and further intercropping would be unwise.

Under the irrigation a different rotation is followed. Cabbage are planted in the spring, usually about April 1st to 10th. These will all be harvested by the first week in July. The ground is then given a light top dressing of manure and about August 1st to 15th, is planted to strawberries. These produce a very good crop the next year. After cropping they are cultivated, cleaned out, and later on mulched and left for a full crop the coming year. When picking is over they are plowed down and the ground planted to late potatoes. The following year the ground is planted to onions, egg-plant or peppers. In this rotation five profitable crops are grown in the four years, while under ordinary means of culture only three would be produced.

If we had needed proof that a rotation of crops was necessary we had an ample one this last season. A half acre plot was planted to egg-plant, half of this area had been an old strawberry patch the previous year and had also grown a crop of late potatoes, or in other words, was the fourth year of the rotation mentioned above. The plants were large and healthy and produced over one-half bushel per plant, of first class fruit. The other quarter acre had been planted with egg-plant the previous year. This crop had been healthy and showed no signs of diseases, but the crop this year developed practically every disease common to egg-plant and I think some that were not. The crop was almost a total failure. These two plots were side by side and throughout the season it was easy to tell, even from a distance, just where the division came. We find that if a crop is not planted oftener than every four years, the diseases common to it and the family to which it belongs give very little trouble, a probable exception to this is the mosaic disease and I very much doubt if this is carried over in the soil, but rather with the seed.

To sum up, rich soil, good cultivation and proper rotation, will give large, healthy, profitable crops with the minimum expense and labor.

PROF. CAESAR: Was it a disease that caused the wilting of the egg-plant?

A.—Yes, and we also had a lot of leaf spot, and insect pests, and the white fly was also very bad this year. The plants were raised in the greenhouse and got infected there. The plants were all the same, so that it could not be due to anything else than want of proper rotation, and having two crops in succession.

Q.—What kind of setting do you get from the strawberries?

A.—A good setting.

Q.—How wide do you leave the rows?

A.—About eighteen inches. We have conditions in Essex that are perhaps different from other parts of the province. We have a long growing season. In fact, when I left home on November 11th we had had only one white frost, and everything is growing yet. We have an irrigation system, and dry weather does not have any effect. We always water the ground before planting.

MR. BUNTING: Do you have any difficulty in getting plants at that time of the year?

A.—No, we generally leave a row for the purpose of raising plants. Our second year is the best picking. Our land is badly infested with a kind of Crowfoot weed that comes on the last of June. We use a heavy cultivator and plow the rows down to six inches wide. Our soil is loose and we use a spring tooth cultivator and cultivate the width of the row and then harrow with an adjustable harrow crosswise; that generally tears them up pretty well, and a little hoeing will clean the patch, and after that they will come on fine.

REPORT OF RESOLUTIONS COMMITTEE.

Moved by MR. BUNTING, seconded by MR. FISHER: "That in view of the rapid depletion of the ranks of qualified men in the various departments of agriculture in Canada owing to more attractive financial conditions elsewhere and in other lines of Industry: This convention would respectfully urge upon the Federal and Provincial Governments the advisability of special consideration being given to this undesirable state of affairs, and that steps be taken to retain in Canada

the services of men who have demonstrated their worth and ability in the public service."

Moved by MR. BUNTING and seconded by MR. CRAISE: "That the members of this convention of the Fruit Growers of Ontario believe that the time is now ripe for the bringing together of the fruits of the various provinces of this Dominion in a 'National Apple Show' and would request the incoming directors to take such steps as may be necessary, by communicating with sister societies and the officers of the Fruit Branch at Ottawa, with the view to arranging and preparing for an exhibition of fruit in the Fall of 1920, to be held in the City of Toronto, but which would be Dominion-wide in its scope and influence."

Moved by MR. BUNTING, seconded by MR. DEMPSEY: "That in connection with the above 'National Apple Show' we believe it would be a very opportune time to hold the Fifth Dominion Fruit Conference, when problems of a general character in connection with furthering the Fruit Industry of Canada, might be considered and discussed by representatives from all provinces of the Dominion, and that plans to this effect be taken up at once."

MR. CUTTING: I would suggest that a Dominion Fruit Conference be recommended regardless to whether an apple show is held or not. I think the important point in this resolution is the holding of a Dominion Fruit Conference.

MR. FISHER: What are the particular questions to be introduced at the conference? No doubt the Department will want to have a definite object.

THE CHAIRMAN: Different things will be coming up from time to time. We have several important questions at the present time; the basket question is a pressing one. Probably in another year it may be necessary to mark the weight on every package. A barrel of apples cannot be shipped to the United States unless it is marked "U.S. standard barrel."

MR. BUNTING: Another fact that is important is that the British Columbia and Nova Scotia Fruit are capturing the market, and it seems to me that Ontario Fruit Growers should get acquainted with their competitors and learn their methods.

MR. SHEPPARD: The fruit business in the Province of Ontario is going back, and we will have to do something. I think it would be a good thing for the Provinces to get together, and see if we cannot do something to help the fruit industry.

PROF. CROW: There will be no lack of topics for discussion. Mr. Sheppard's suggestion gives me the opportunity to emphasize the changes that have taken place in Ontario apple growing. Any one who has travelled over Ontario must realize that Ontario apple growing has fallen back very materially during the last few years. I do not think it is too much to say that Ontario apple growing has gone back twenty years in the last five years.

Moved by MR. BUNTING, seconded by MR. FISHER, "That, whereas, during the past few years the Government Employment Bureau has given special attention to the enlisting of women and girls for work on the fruit farms of the Province, and whereas, there is still a desire on the part of the fruit growers that this help be available in order that they may maintain and increase their production, and on the part of the women and girls that they have this opportunity for a healthful and remunerative vacation, therefore we would respectfully request that the Government continue to conduct this branch of their employment bureau." Carried.

MISS STRAITH: There may be some misunderstanding about my representing

the girls in this movement. The Ontario Government Employment Bureau has charge of sending the girls out to the farms, and I represent the Dominion Conference of the Y.W.C.A., who have for the last three years taken charge of the girls in the matter of housing. I would ask you to try and not consider what I say as being said on behalf of the Y.W.C.A., because I am keenly interested in this movement of the girls to the land, and I am also keenly interested in the building up of the fruit industry. I come here for the purpose of getting the feeling of the meeting as to whether they care to have these camps continued. From what I have heard since coming here I judge that you would like to have these camps continued, and that they are still necessary. The Y.W.C.A. are unable to carry on the boarding houses in the country and come out even, as they can in the city. Last year where camps were provided for 20 or 25 girls sometimes only 4 girls came. I do not know whether that situation can be remedied or not. On the other hand, occasionally a number of girls came in quite unexpectedly, and this hampered us very much in the matter of food supplies. People from the city have the idea that all they have to do is to go out in the country and there they will be able to get chickens and butter and eggs and vegetables without any difficulty and at low prices. That has not been our experience, in fact, we found that we were paying higher prices for vegetables in the country than we could buy them for in the city. We were criticized very strongly for bringing girls out to the country and feeding them on canned vegetables. I said to one man "Have you a garden?" and he said "No." I said "Is there any man in the district that runs a truck garden?" and they did not know of one. Then I said: "How do you propose to feed the girls on fresh vegetables that are not grown within one hundred miles of this place?" Lack of storage in the camps is another serious difficulty, we are unable to buy in large quantities because of that. Ninety per cent. of the House Mothers reported that the fruit growers were too busy to give them any attention and assist them in the matter of buying. One housekeeper told me she had hunted the country over and could not buy potatoes, and one day a farmer told her he could have taken her where she could buy plenty of potatoes at a reasonable price. This year the price of food has been exceptionally high, and the price of labor has gone up, and we were paying our housekeepers and cooks a much higher price than we paid the year before. I am speaking to you of the difficulties, to see whether something cannot be done to eliminate what is rather a big problem with us. Unless something can be done we will have to raise the price of board. I believe the large percentage of the girls earned from \$9 to \$15 per week this year, and that was very encouraging. I think the fruit growers might give us more assistance in purchasing, and they might furnish us with vegetables and fruit at a more reasonable rate. The question with us is whether we should go on with the work and lose money. I would ask you to formulate some scheme whereby the Y.W.C.A. may be reimbursed or secure some grant whereby they may be enabled to carry on the work. This year there were between 70 and 80 fruit farmers who engaged girls from the camps. The question is, is it worth while to you? The question with the Y.W.C.A. will be "Are they justified in spending public money on this work, and to what extent can we count on the co-operation of the Fruit Growers?" I was very glad to hear the resolution that you have just passed asking the Government to continue the work. Many of the girls will be greatly disappointed if the camps are not continued, and I know that a number of the men have said that they will have to depend on the girls for another year.

MR. FISHER: We are vitally interested in this question in our district, from the fact that we require a large surplus of help over that which is supplied locally. One or two camps in the district is a great relief. I would like to see this movement receive every possible encouragement from this Association. We believe it is useful work. The fact that the Y.W.C.A. have had a deficit is most unfortunate, and I think it is largely due to the fact that in some of the camps they have not had the full complement of girls. Possibly a remedy for that would be to reduce the number of camps. If we can get 40 or 50 girls in our district it will help to relieve the situation.

Moved by MR. FLEMING, seconded by MR. CARPENTER: "That the Board of Directors consider the advisability, or otherwise, of combining the present system of appointing one director from each of the geographical districts with representation according to membership in the Association, and report at the next Annual Meeting."

Moved by MR. FLEMING, seconded by MR. CRAISE, "That a small committee be chosen by the directors to take up the question as to whether Government grades for peaches are desirable, and report to the next meeting of the association.

The following resolution was forwarded for approval by the Canadian Horticultural Association.

Moved by PROF. CROW, seconded by MR. CRAISE: "Whereas a well developed Horticulture is recognized as essential to the welfare and prosperity of Canadian home life, and

"Whereas Horticulture is a definite craft in itself and is not a branch or department of Agriculture, and consists of the more intensive cultivation of fruits, and flowers, and vegetables and ornamental plants, and

"Whereas there is a great shortage in Canada of trained Horticulturists, and

"Whereas scientific research in Plant Physiology, Plant Pathology and Entomology is of vital importance to the future development of Horticulture in Canada, and

"Whereas systematic plant improvement and plant introduction are likewise of fundamental importance to the future of Canadian Horticulture. Therefore be it resolved that this committee recommends the establishment of special facilities for the practical and scientific training of men in Horticulture, and further recommends that all Horticultural organizations in Canada be requested to appoint representatives to a Canadian Council of Horticulture, with a view to formulating plans for the adequate development of Horticultural interests in Canada as outlined herein."

PROF. CROW: This resolution came from a special committee appointed by the Florists' Organization. The special committee, after considering the matter, decided that the thing we need most in this country in connection with horticulture is some authoritative body who can speak for the interest of horticulture. They have in mind the establishing of a National Council of Horticulture. That Council would be of an advisory character, and would, where necessary, bring about any new machinery which may be required.

The Convention then adjourned.

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